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MACWORLD

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The Macintosh™ Magazine

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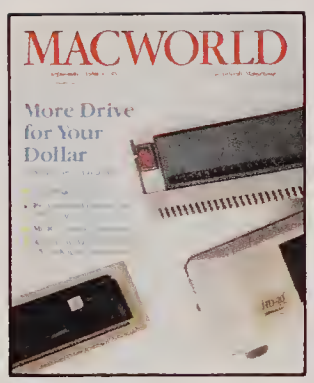

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▪ *Record Holder* No dramatic breakthrough, but at less than half the price of its major competitor, this sturdy data manager is worth a try.
▪ *FullPaint* Is this the Mac graphics program you've been waiting for? Draw your own conclusions.
▪ *MaxThink* Get organized with this full-featured—but nicely priced—outline program.
▪ *KidsTime* Five entertaining educational programs for three- to eight-year-olds.
▪ *Uninvited* A mystery-in-the-mansion text and graphics game from the maker of *Déjà Vu*.
▪ *MacKeymeleon* Keyboard reassignment—including your choice of 14 foreign keyboard layouts—made easy.
▪ *MacInker* A ribbon-recycling system for intensive ImageWriter users.
▪ *Orbiter* Attention space cadets: the first space shuttle simulator may not be a blast, but it is clever and realistic.
▪ *Maccessories Portable Modem* A mini modem for beginners or mobile communicators.
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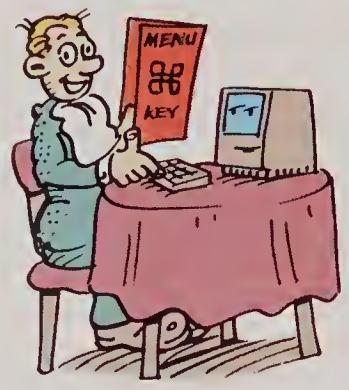

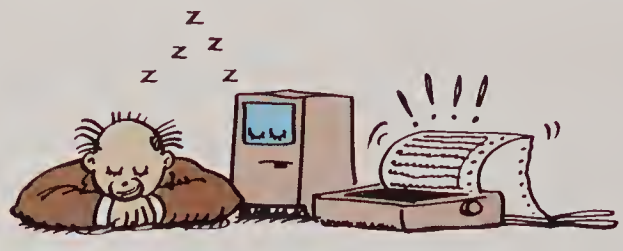

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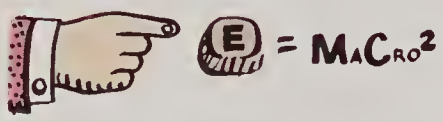

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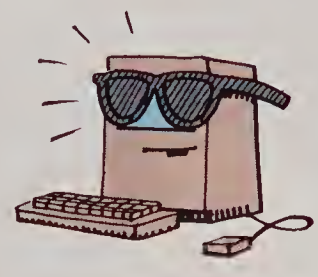

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Illegal or unauthorized copies of software often lead to legitimate sales.

Batten down the software hatches—we're heading for a gale. A move is afoot to introduce a bill in the next session of Congress that would prohibit the rental of personal computer software.

Representative Pat Schroeder, D-Colo., with input from the Software Publishers Association, is sponsoring H.R. 4949, otherwise known as the Computer Software Rental Act of 1986. The issue is complex, problematic, and almost Catch-22 in its ramifications. Although well intentioned, the bill is fraught with danger for the software consumer and the personal computer industry alike.

Why? Because when customers have few meaningful opportunities to test software before buying it, they begin to shrink away from investing in expensive but unproven programs.

Surely we must be able to steer a creative course around the software storm the bill would create. Otherwise a lot of ships are going to go down, with all hands on board.

Schroeder sees software publishers as the sole victims: "Commercial business interests should not be allowed to reap profits from loopholes in the copyright laws or to conduct trade in copyrighted works at the expense of copyright owners."

The "loophole" she refers to is the "first sale doctrine" of the U.S. copyright law, which allows buyers of copyrighted works to dispose of them in any way they choose.

The bill's target is software rental outlets, but the real victim is you—the software user.

In my April 1986 column in *PC World* magazine, I described what I considered the real causes of the decline in personal computer use. I observed that most software is confusing, difficult, and time-consuming to learn and that good software support is scarce. Consequently, customers become frustrated and give up computing instead of advancing further. Rather than encouraging power users, we end up with powerless users—a sad state of affairs.

Now there is an interesting but controversial way to alleviate some of that software frustration—software rental. By renting a program, potential buyers can test its capabilities to see if it really fulfills their needs, and they can try out new applications as well.

Paul Terrell has helped pioneer the software rental concept with his San Francisco Bay Area chain of five Software Emporium stores. But Paul is not new to pioneering: he started the world's second computer store, which later became the world's first computer-store chain, known as the Byte Shops.

When you walk into a Software Emporium, you can easily mistake it for a video store. Terrell has the titles displayed full-face on all four walls. He has a superb selection of software, including packages for the Macintosh, the IBM PC, the Apple II, and the Commodore 64—a much greater variety of software than you would find in most computer stores. Daily rental fees range from $1 to $20, with a minimum two-day rental. If you later decide to buy, you get an attractive bonus: you can apply the full rental cost to the purchase price of the software.

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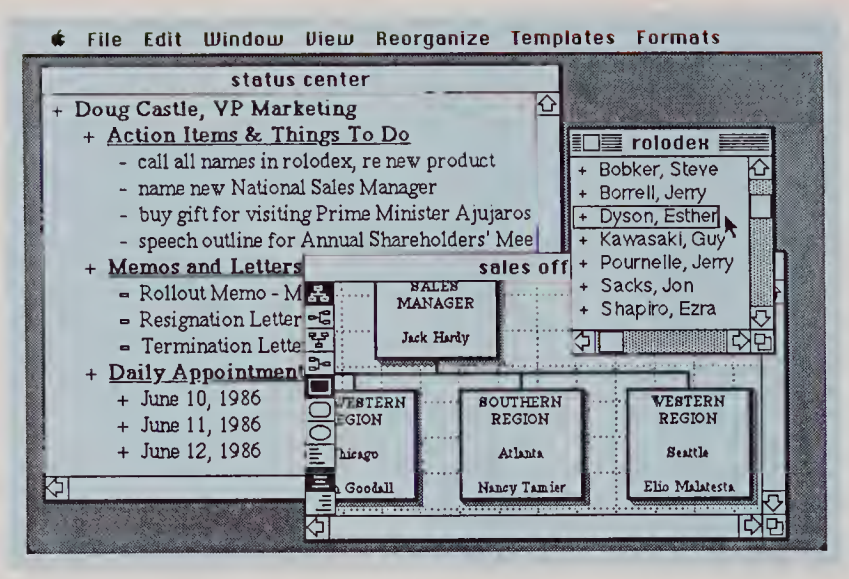

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- *Price Wars - How they Affect American Tech*
- *American Tech's Strengths and Weaknesses*
- *What's the Competition Doing?*
- *Opportunities*
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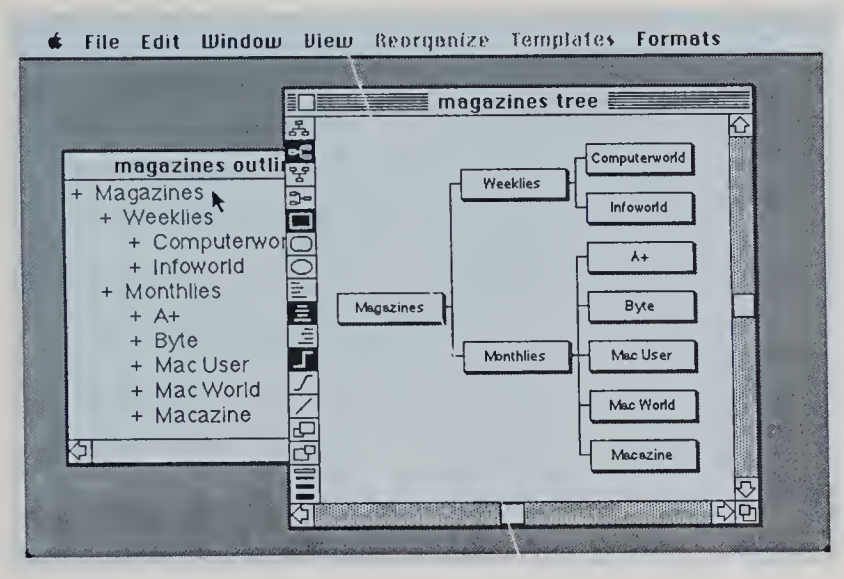

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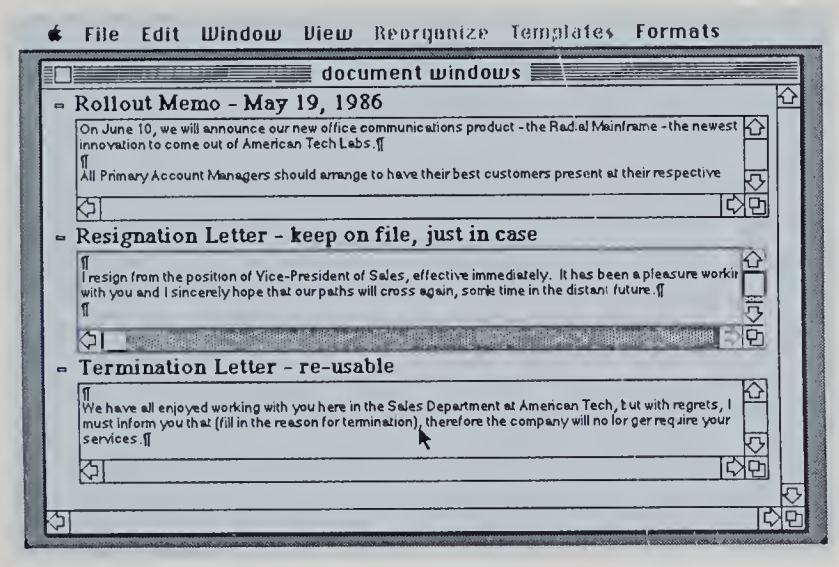

4 MORE has the **third-generation** idea processing features you'd expect from Living Videotext, the undisputed leaders in idea processing technology and the company that brought you ThinkTank 128™ and ThinkTank 512™. Cloning, hoisting, mark+gather, promote, demote, **windows within windows,** intelligent pattern matching, outline templates and calendar templates are just the **tip of the iceberg.** We've been listening to your ideas and suggestions, that's why MORE has **more** idea processing, **more** desktop publishing, **more** desktop productivity, **more** word processing and **more** unprecedented power for your 512K Macintosh or Macintosh Plus. ***MORE has more of what you want!***

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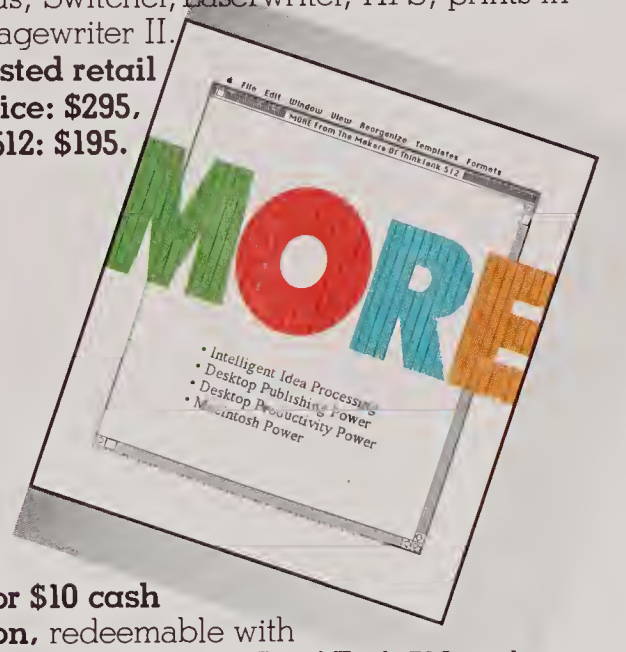

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Of course, some people see rentals as an opportunity to steal software. But as a *PC World* software piracy survey showed (see the September 1985 issue of *PC World*), illegal or unauthorized copies often lead to legitimate sales. People try out unauthorized copies of software, and once they're satisfied that the software is good, they most likely purchase it. They want the documentation, the customer support, and the program updates.

Neither Schroeder nor the Software Publishers Association—which is chiefly responsible for drafting the contents of the Computer Software Rental Act—has investigated the correlation between software rental and piracy.

If software companies would allow software to be rented, perhaps rental software could be copy protected, while purchased software would remain unprotected. You could try out any program you found interesting, and if it passed inspection, you would be motivated to buy it.

This would solve the serious training dilemma associated with software. For this reason, I think Paul Terrell and his Software Emporium are really onto something.

Unfortunately, some software rental companies operate on the premise that all software renters are thieves. These stores frequently sell code-breaking programs like *Copy II PC* or *Copy II Mac,* thus encouraging their customers to pirate programs.

This unconscionable behavior is undoubtedly the impetus behind Schroeder's anti-software-rental bill.

The problem with Schroeder's bill is its potential to destroy the software rental business altogether. Paul Terrell's approach to software education would then disappear.

We should encourage Terrell's alternative because it's a positive solution to the number one cause of declining personal computer use: the almost perverse complexity of software.

In announcing her proposal, Schroeder noted the passage of similar legislation banning the rental of audio recordings.

No real parallel exists, however, between the two products. You need not test a record album to determine its value. You hear the music on the radio; then, if you like the song, you buy the album.

Software is different. No store is completely reliable. You can read reviews in

(continues)

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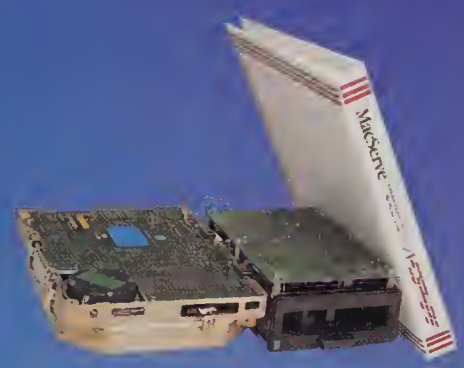

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Magnum 800

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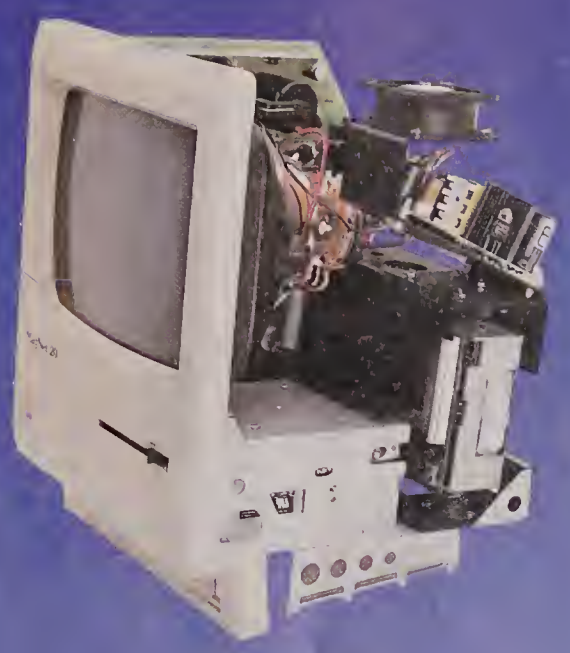

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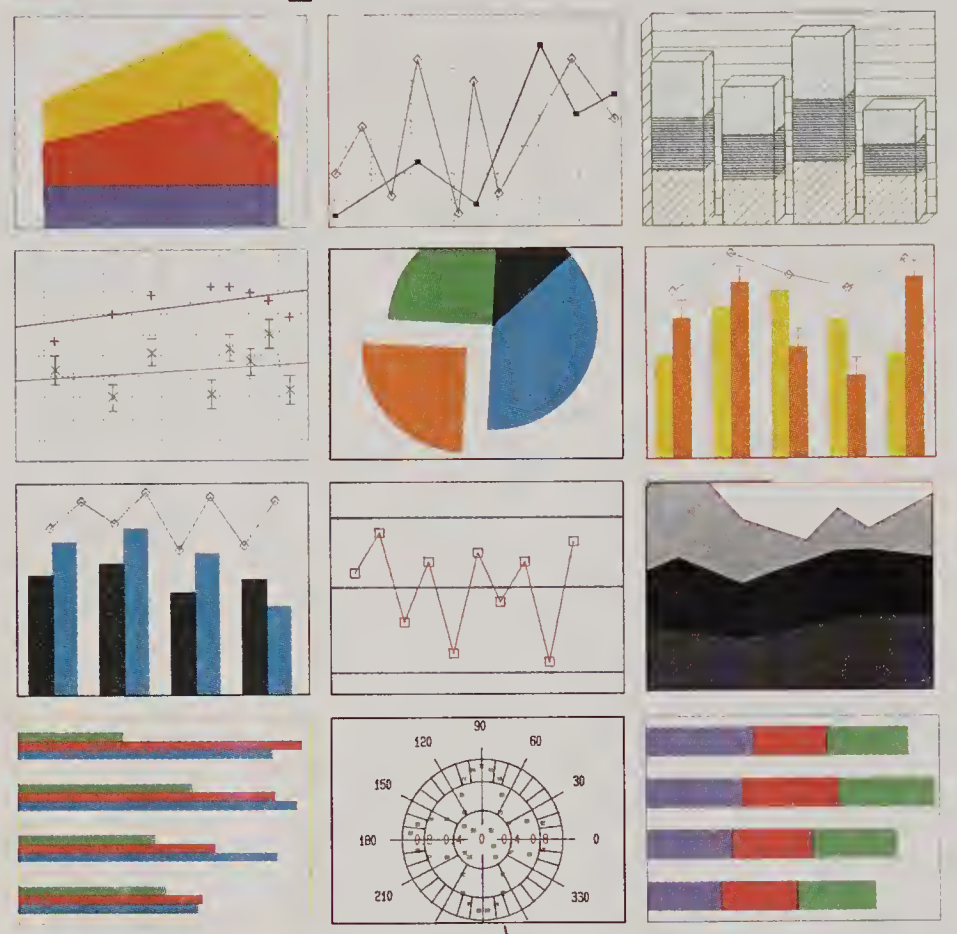

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magazines, but they provide only a certain amount of information. You can read advertising claims, but you can never be certain how a particular package might suit you. Until you run it, you can't really tell if it will work in your computing environment.

Because of these fundamental differences, the software business needs different laws than the record business. To draft a bill for the computer industry based on record industry legislation is a critical mistake.

Schroeder expresses concern about software rentals impeding the growth of the software industry because people steal rented software.

Anyone who's involved with personal computers can easily see that software companies impede their own growth when they market programs that don't work and have poor documentation—not to mention undocumented features and substandard support.

I doubt if software rental curtails software sales by more than 1 percent, certainly a marginal amount. On the other hand, software rental enables us to find out whether a program works before we put our money down.

Why should we have to pay $700 for a database program, only to discover that it doesn't meet our needs, that it's bug-ridden, or that we can't figure out how to use it? Why can't we test-drive it first?

Schroeder's bill assumes that the consumer is wrong and that the software company is right. Ironically, the bill's passage may prove most damaging to those it's intended to protect—the software companies.

Eventually, many software customers will begin to shrink from investing their money in expensive but iffy programs.

And that would be a great loss for everyone—customers and software publishers alike.

Surely, software vendors and legitimate software rental businesses can find a creative solution before Schroeder's Software Curtain falls.

I urge readers to write to Schroeder expressing their concern about her proposed Computer Software Rental Act of 1986: Patricia Schroeder, Congresswoman, First District, Colorado, 2410 Rayburn House Office Building, Washington, DC 20515. □

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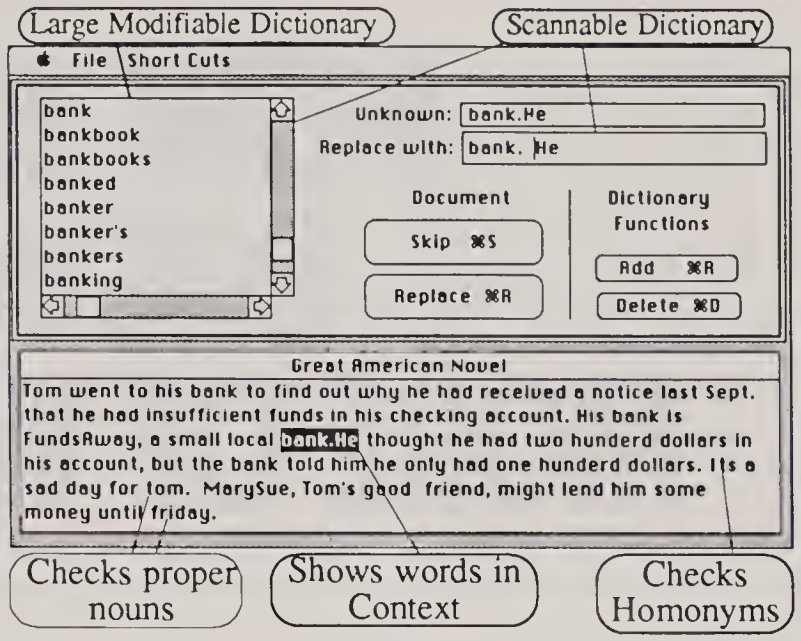

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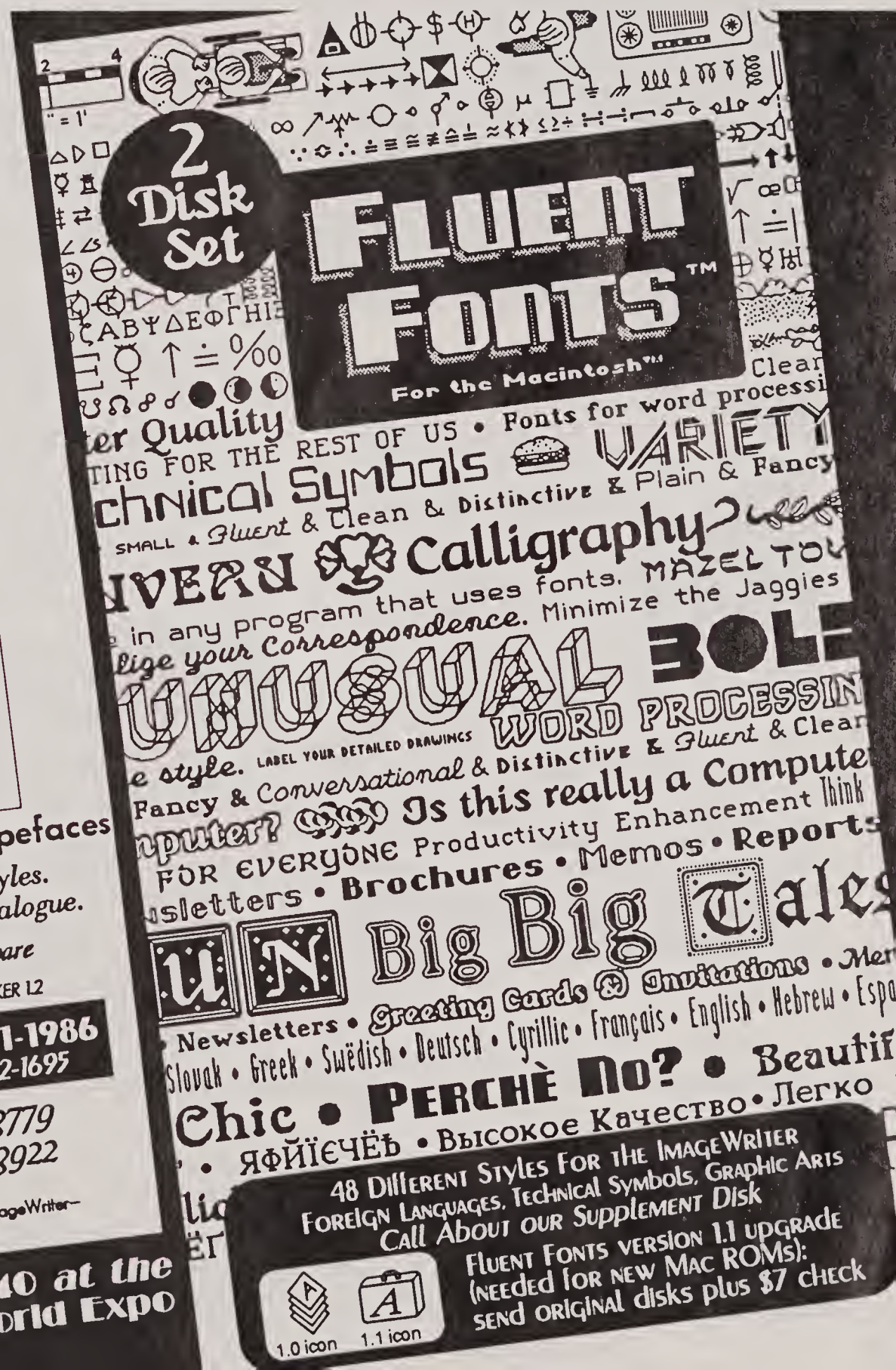

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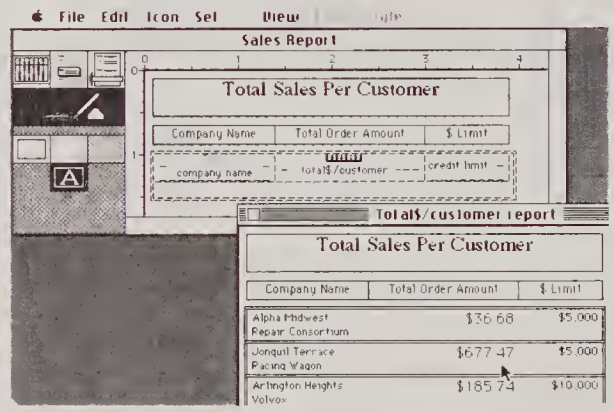

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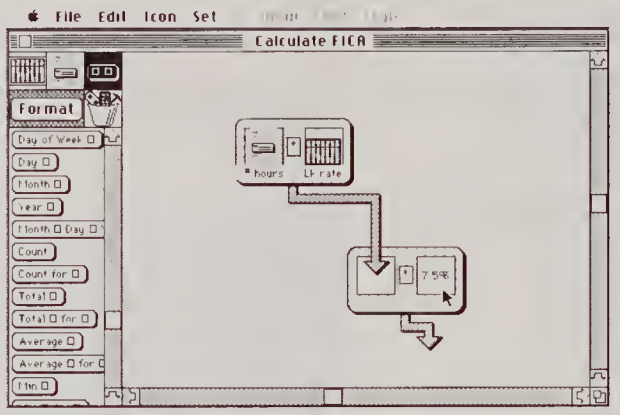
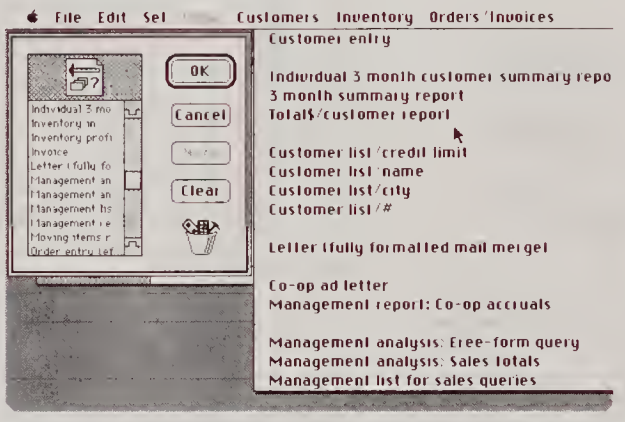


With Double Helix, you can fashion visual statements almost as easily as you can say them. Click & drag from among more than 80 calculation tiles in the list to the left. Then just drop in icons or type in constants. Connect with arrows, and you have made a powerful "program" that works automatically wherever it is placed.

Now, applications that anyone can use

Create custom menus with Double Helix. Productive work begins immediately, without computer training or technical support. You can even set passwords to secure your sensitive information and prevent unauthorized changes.



Simply type your own menu names into the Macintosh menu bar, drag form names into the menu and click OK. From then on, just pull down menus to make forms appear for entry, automatic reports, and printing.

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This package includes: three disks (the Double Helix program disk, System disk, and Resource/Work disk with sample applications), two reference manuals, a Quick Start Manual and an 18-ring project binder with note pad. To Odesta, your business is as important as our own. Call us toll-free with technical questions or to inquire about our Consulting and Design Services.

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MACWORLD EXPOSITION

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Jerry Borrell

Born-Again Enthusiast

New prospects for the Mac revive the spirits of a jaded computer watcher

'Next year will begin a halcyon period for computing.'

After nearly a decade of work in the computer industry, I sometimes forget my original wonder with computers. Over the years my concern for the business of computers and electronics displaced my fascination with technology and its impact on society. Exuberance gave way to ennui, arising in part from the constant changes that occur in semiconductors, computers, communications, and manufacturing—enough to numb the most avid enthusiast. In part my feelings are shaped by experiences as a computer owner—feelings such as frustration with the amount of money I've invested, the recurring sense that my computer should be able to do more, and impatience with mechanical foibles.

Joining *Macworld* last November has recharged me with the same intensity I felt when microprocessors were new and personal computers were becoming a reality. For my first review of an Apple II (16K) in 1982, I had to tinker with the integrated circuits on the motherboard to attach a color monitor; fortunately the frustration level has decreased since then.

My enthusiasm has returned, not so much because of the Macintosh but because of Apple's commitment to the Macintosh product line's expandability and performance. Next year will begin a halcyon period for computing: the year 32-bit microprocessors combine with photographic-quality computer graphics, communications, and a wealth of new functionality to make the desktop computer exciting again. Not the excitement of slick ad campaigns, but the thrill that keeps us up nights learning how to do things with our computers.

The Macintosh product family will be a focal point in this era in which personal computers support advanced operating systems—such as UNIX—without causing us to resort to programming or arcane syntax. An era in which many manufacturers will offer computers that use the desktop, window, and icon metaphors. The Macintosh family is likely to stand in the middle ground between the mass-marketed offerings from Atari and a new generation of products from Sun Microsystems, IBM, and Apollo. The open Mac has the potential, if prices are kept low enough, to instigate another bull market like the two-year personal computer boom that began in 1982.

Editor Borrell joins Apple executive vice president Del Yocam for a look at the new Cray supercomputer.

ED KASHI

I hope this is the era of computing machines that allow us to grow as technology becomes more sophisticated—to graphic displays that rival nature in richness and detail, to programs that compete with the sophistication of human thought, and to communications as simple as the telephone system. We can see the rudiments of each of these: AT&T and Sun cooperating on UNIX development, implementation of advanced graphics techniques at Pixar, and the openly discussed Macintosh of this winter.

We are on the edge of a technological dream, waiting to see what appears when we open our eyes. □

THESE EXPERTS

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"One of the best programs out for the Macintosh in a long time."
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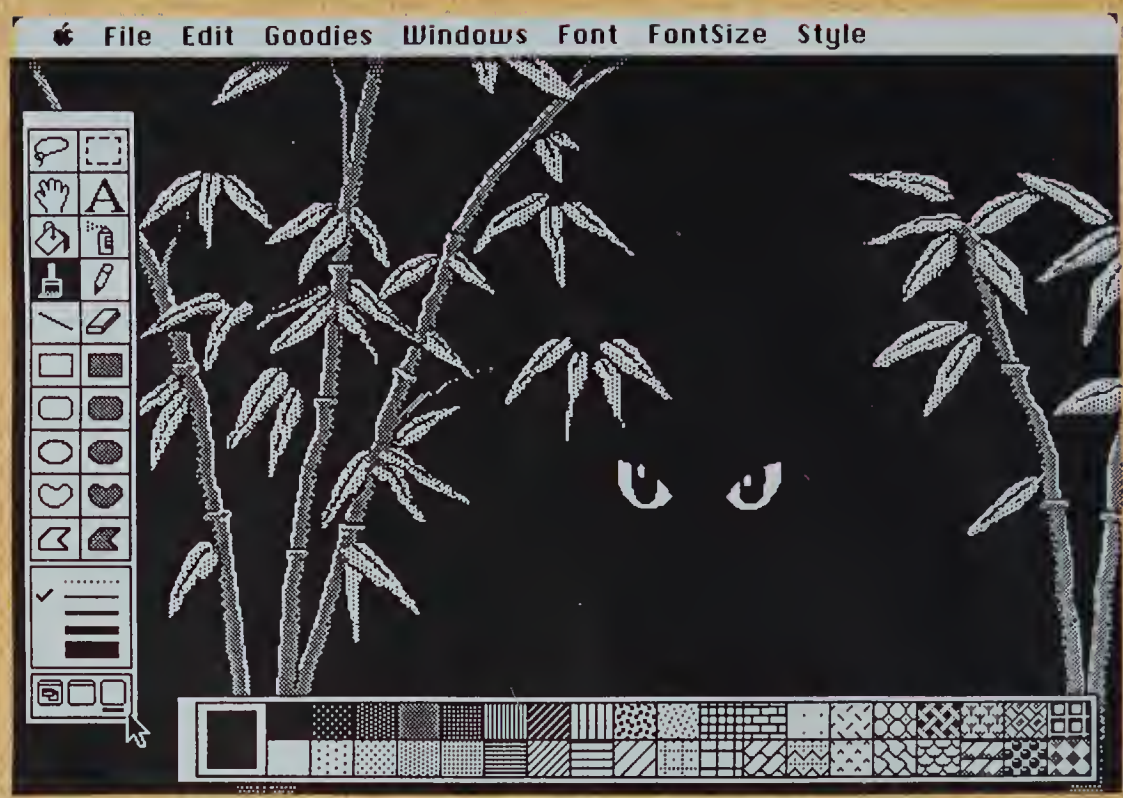

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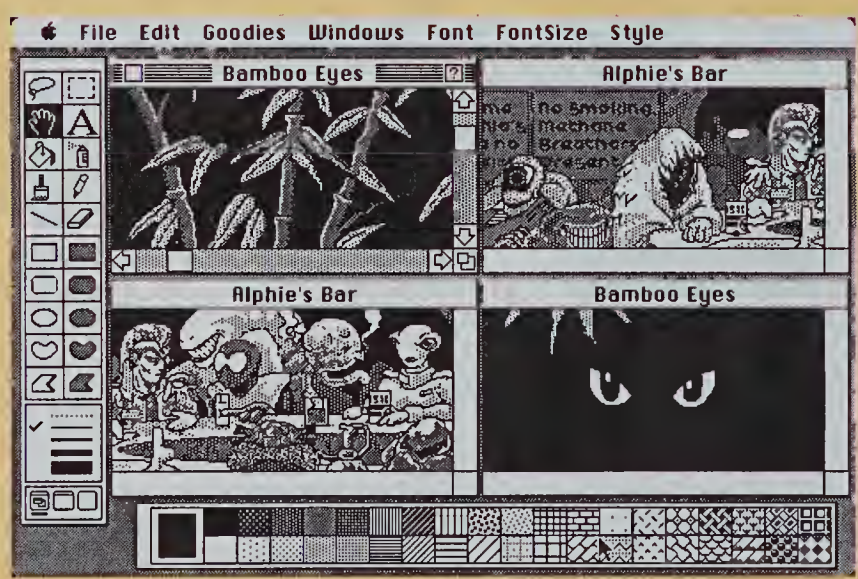

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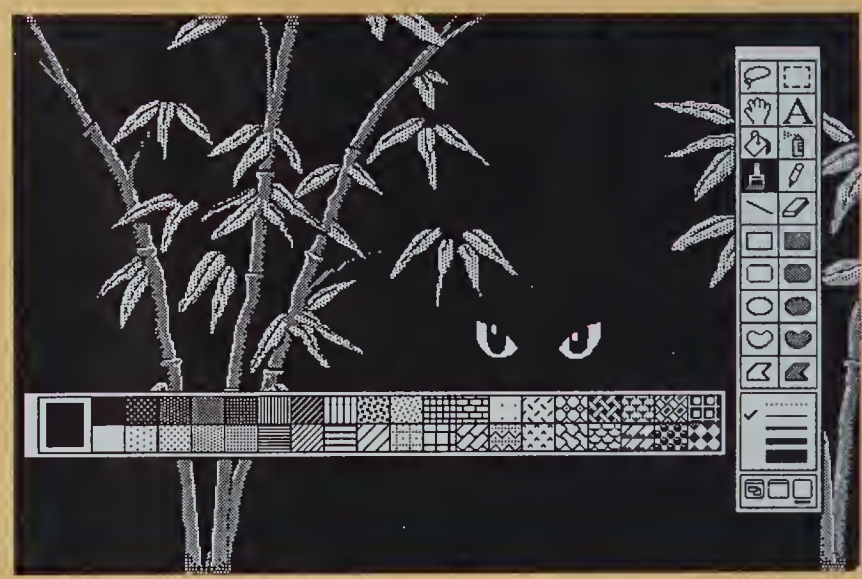

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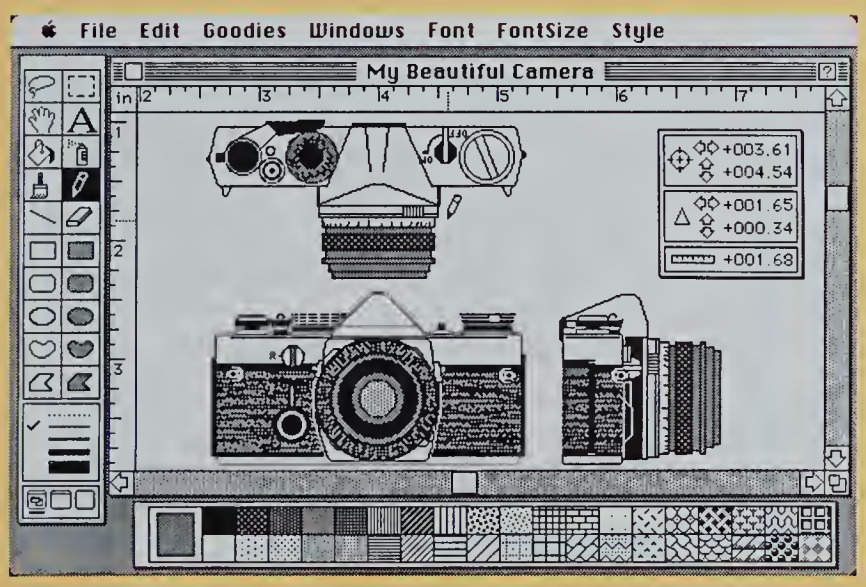

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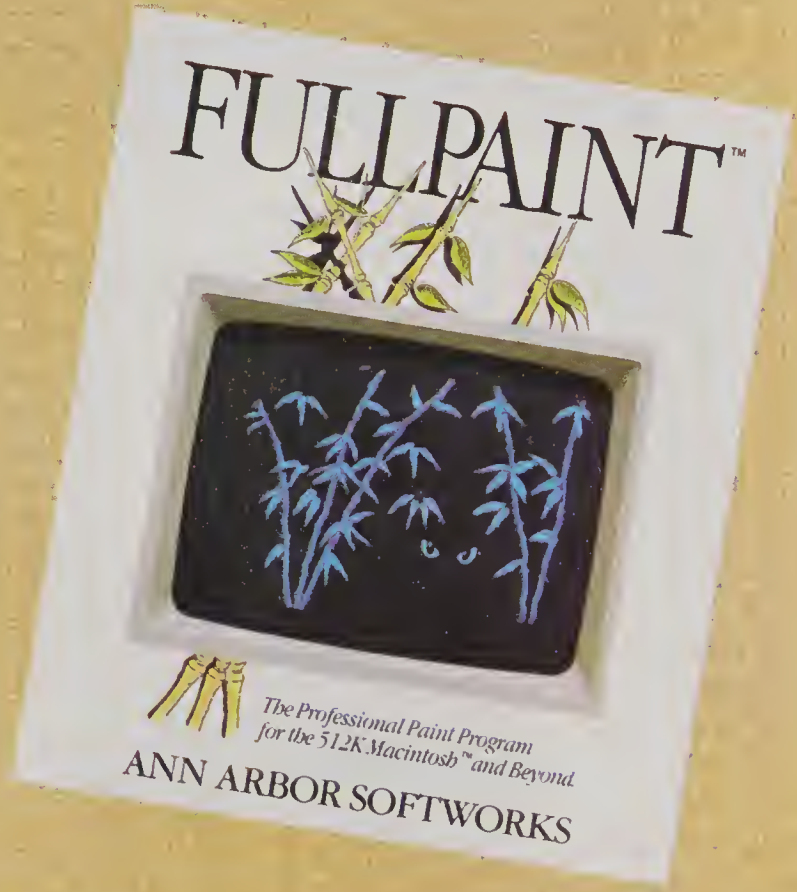

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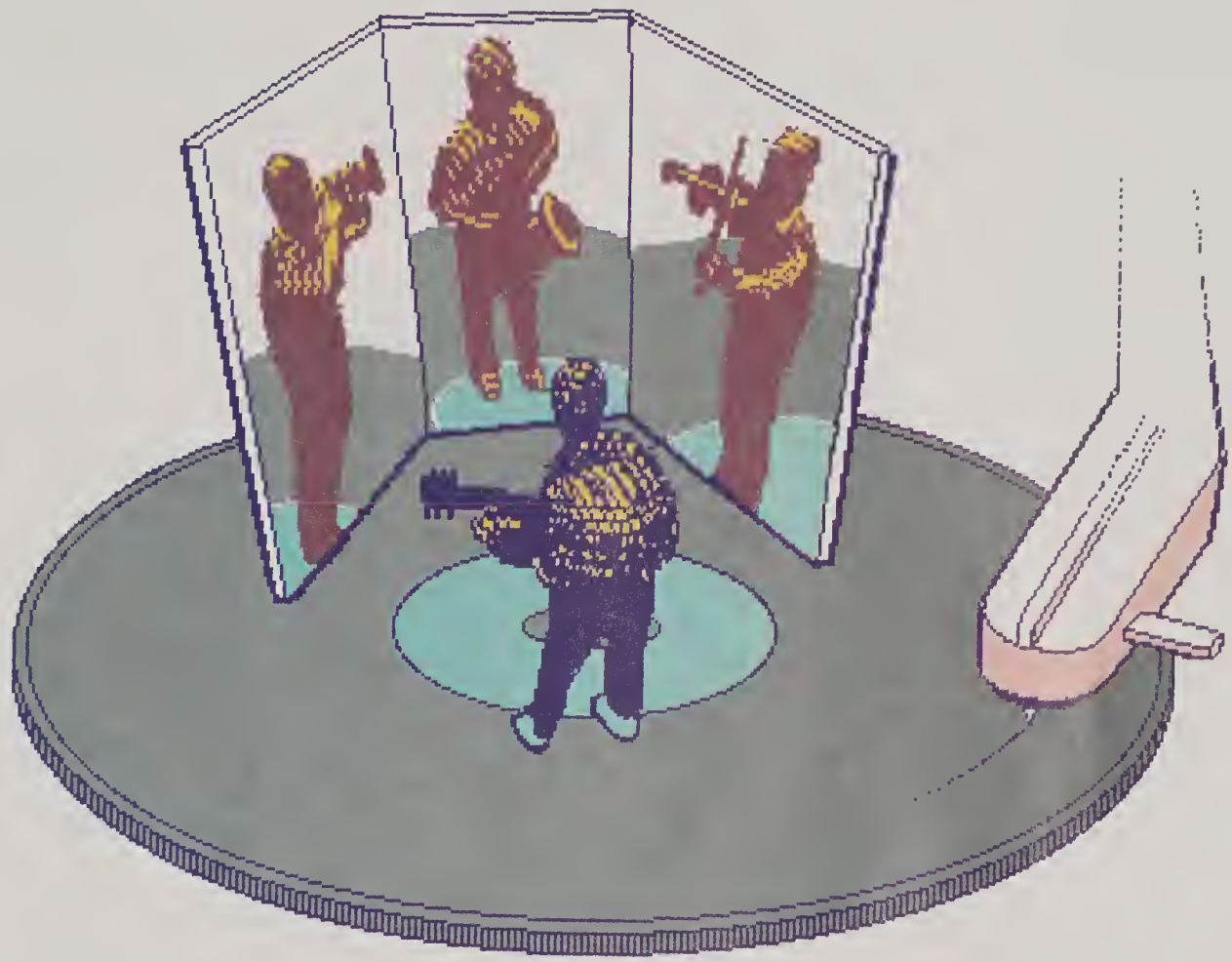
Steven Levy

MIDI Life Crisis

Can a columnist turn into a rock superhero with a boost from the Mac?



MICK WIGGINS

Early in my fourth decade of life, it began to dawn on me that I would never become a rock 'n' roll star. Though I had done little during the past 20 years to advance my musical career—occasionally strumming some coffeehouse tunes on a Martin D-28—this revelation was a dark milestone. You see, I had considered this writing thing a time killer. Something to turn a buck until I could get to the real work: headlining America's great arenas, whipping 20,000 fans into spasms of madness and temporary deafness.

I had just about conceded the field to Bruce Springsteen and Johnny Rotten when I visited some rock record producers. They told me that computer technology had dramatically transformed the recording studio, in the process opening the field to a new class of musician-composer-performer. Someone with good musical ideas but little skill in performing—even a person who can't read music—now has the power to create a "demo" tape that fleshes out ideas into a listenable form.

So when a representative from an electronics company boasted that "anyone can make a hit record in half an hour," I immediately volunteered. And though I did not make a hit record, I did produce a decently funky rock-fusion ditty using state-of-the-art recording equipment.

Synthful

But how many people have state-of-the-art recording equipment? Not me, to be sure. But recently I acquired an amazing toy—a Casio CZ-101. Retailing at under $500 and available at some discount outlets for half that price, the 101 is quickly becoming the Volks-synthesizer. Though you might not find it in Herbie Hancock's keyboard armada, it is a real synthesizer, allowing users to construct sounds by manipulating the elements of sound itself. It can make fairly convincing imitations of almost every instrument imaginable. And by using something called a MIDI interface, the CZ-101 can hook up to my Macintosh and make real magic. As well as some music.

Instead of launching into an explanation of MIDI and its significance in changing modern music, let me get to the bottom line. Can the combination of Macintosh and Casio make me a rock 'n' roll star? To the mental accompaniment of Ray Davies singing "Low Budget Man," I decided to try an experiment: how much music power can a synthesizer-ignorant Macintosh owner obtain by spending only a few hundred dollars on equipment and software?

The first requirement is the device that allows the synthesizer to communicate with the Mac. Several are available, and I settled on the Assimilation MIDI Conductor, which lists for $89. I had no problems with it, but not long into my new career as a digital musician, I purchased a Mac Plus and discovered that none of the MIDI interfaces then available worked on the Plus, due to Apple's inexplicable fiddling with the serial port. (Just recently, Opcode Systems released a Mac Plus MIDI interface that lists for $175.) So I had to forego the ample memory of the Plus and keep using my old Mac.

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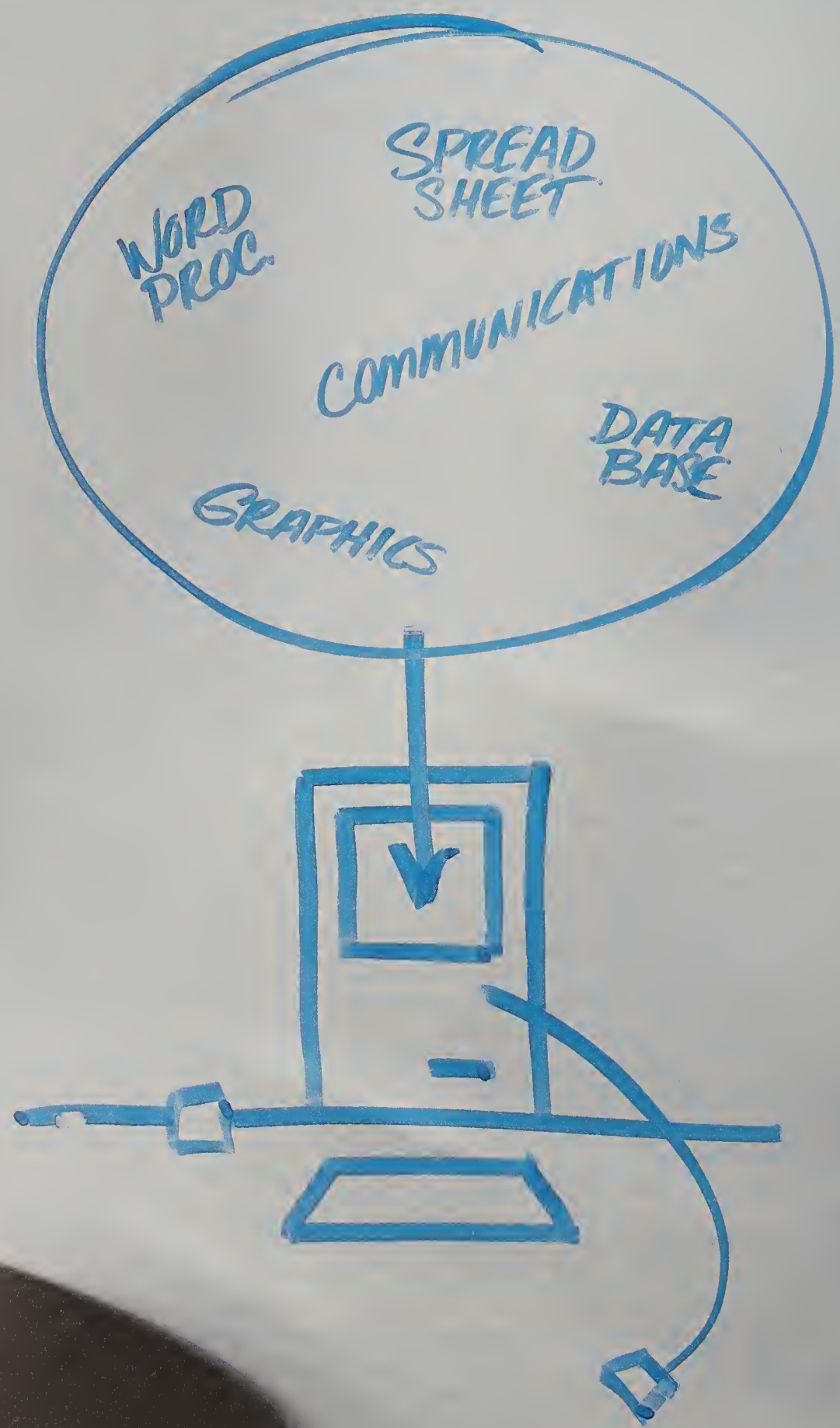
CONSTANT COMMITMENT

JAZZ



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THE POWER DESK

JAZZ + MAC

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The interface plugs into the modem port and comes with the proper cables to hook into the Casio. The ease of the connection only heightened the uneasy feeling I had about hooking up a musical instrument to my computer. Even though I knew that the musical instrument in question was a computer (a digital synthesizer has more chips than a bag of Fritos), it seemed impious. Not the kind of thing that Beethoven might try. But then I recalled that the initial response to the electric guitar was horror and ridicule. Like B. B. King and Bob Dylan, I embraced the marriage of music and technology.

Sounds Right

The first piece of software I tried was *Patch Librarian,* by Opcode Systems. *Patch* is synthesizer lingo for a sound, be it one that emulates a violin or a cat being stepped on. The Casio has 16 preset patches in ROM—standard stuff like organ, trumpet, and bass—and room for 16 "internal" patches in RAM. The preset sounds are there for eternity; the internal ones can be programmed by a hideously tedious process of fixing parameters, wave envelopes, and other Theory of Acoustics esoterica. Once you create the patches, you store them on a RAM cartridge that holds 16 patches and costs $35. Or at about a hundred dollars a shot, you can buy additional preprogrammed patches. The synthesizer may be cheap, but the sounds aren't.

The solution is *Patch Librarian.* For a mere $50, this program gives you over a hundred sounds and allows you to store hundreds more on a Mac disk. I spent a few hours merely testing the sounds, everything from a soothing acoustic guitar to something that sounded like Jimi Hendrix orchestrating the closing scene of *Apocalypse Now.* I can't imagine anyone with a Casio and a Mac not taking advantage of this software. (Opcode is also about to release a patch editor, which will greatly simplify the process of programming your own patches; at $125, *The MIDIMAC Patch Editor* will include *Librarian.*)

Armed with proper sounds, I was ready to do the hard work of recording. I gave myself a modest challenge—to produce a version of Rockin' Sidney's great zydeco hit, "(Don't Mess with) My Toot-Toot," with several instruments going at once. One handicap was my near-complete inability to play keyboard instruments. But I figured that technology could easily compensate for that.

Using traditional sound studio technology, I'd have to record my performance track-by-track on a tape recorder. The computer equivalent of a multitrack tape recorder is a sequencer: it does the job of a tape machine but stores music digitally. Several good under-$200 sequencer programs are available for the Mac. I tried Opcode's *MIDI Mac* sequencer and the *MegaTrack* sequencer, by Musicworks. Both employ tape-recording metaphors, and their screen displays include record and playback "buttons."

I played a few chords on the synthesizer and chose Playback. It was startling to hear my fumbling progression precisely echoed. I realized that using the computer as a sequencer forces you to rethink your concept of music. Musicians generate information. So when I press three keys on the Casio, the cable labeled MIDI Out tells the Macintosh not only which keys are being pressed but also the characteristics of the

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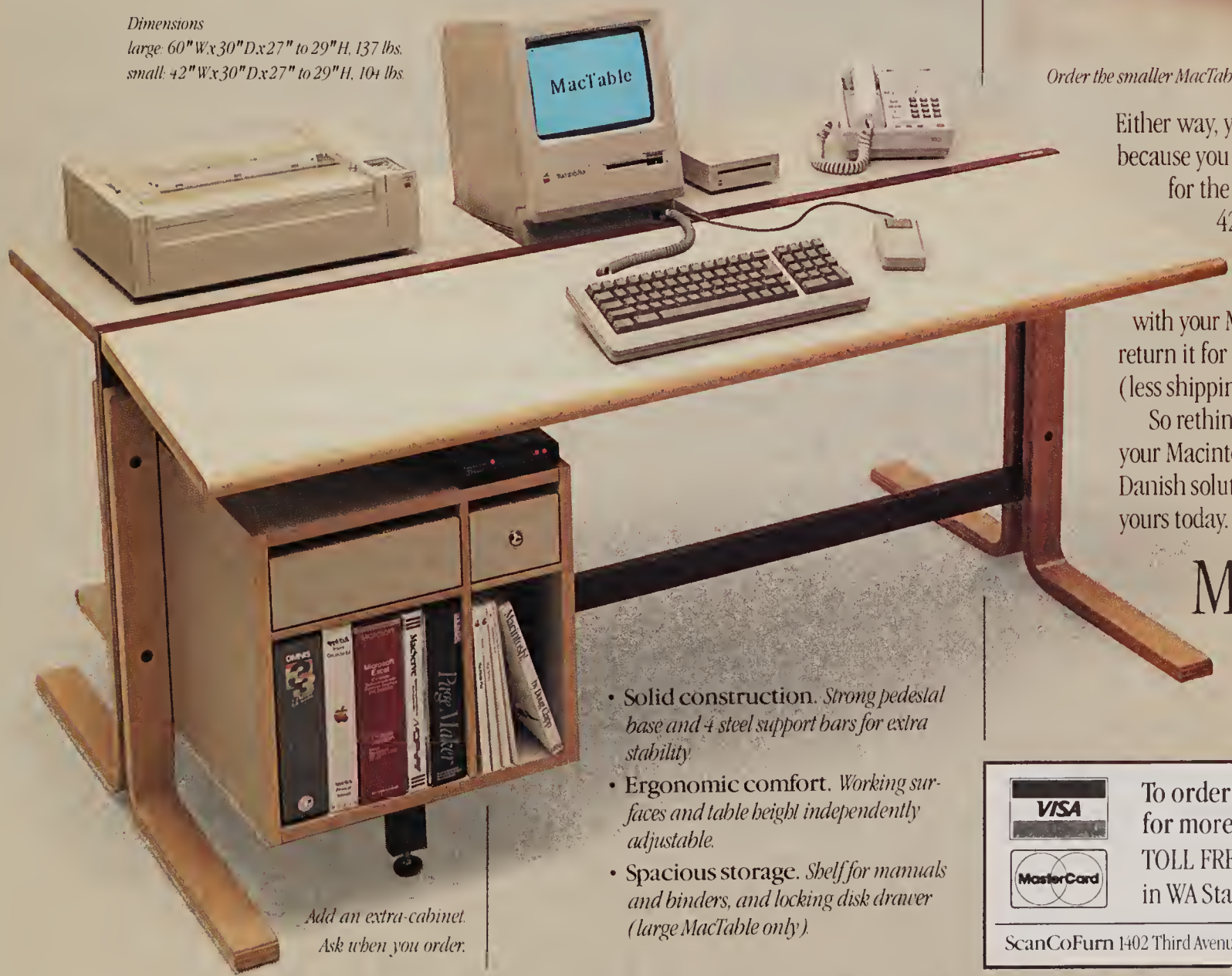

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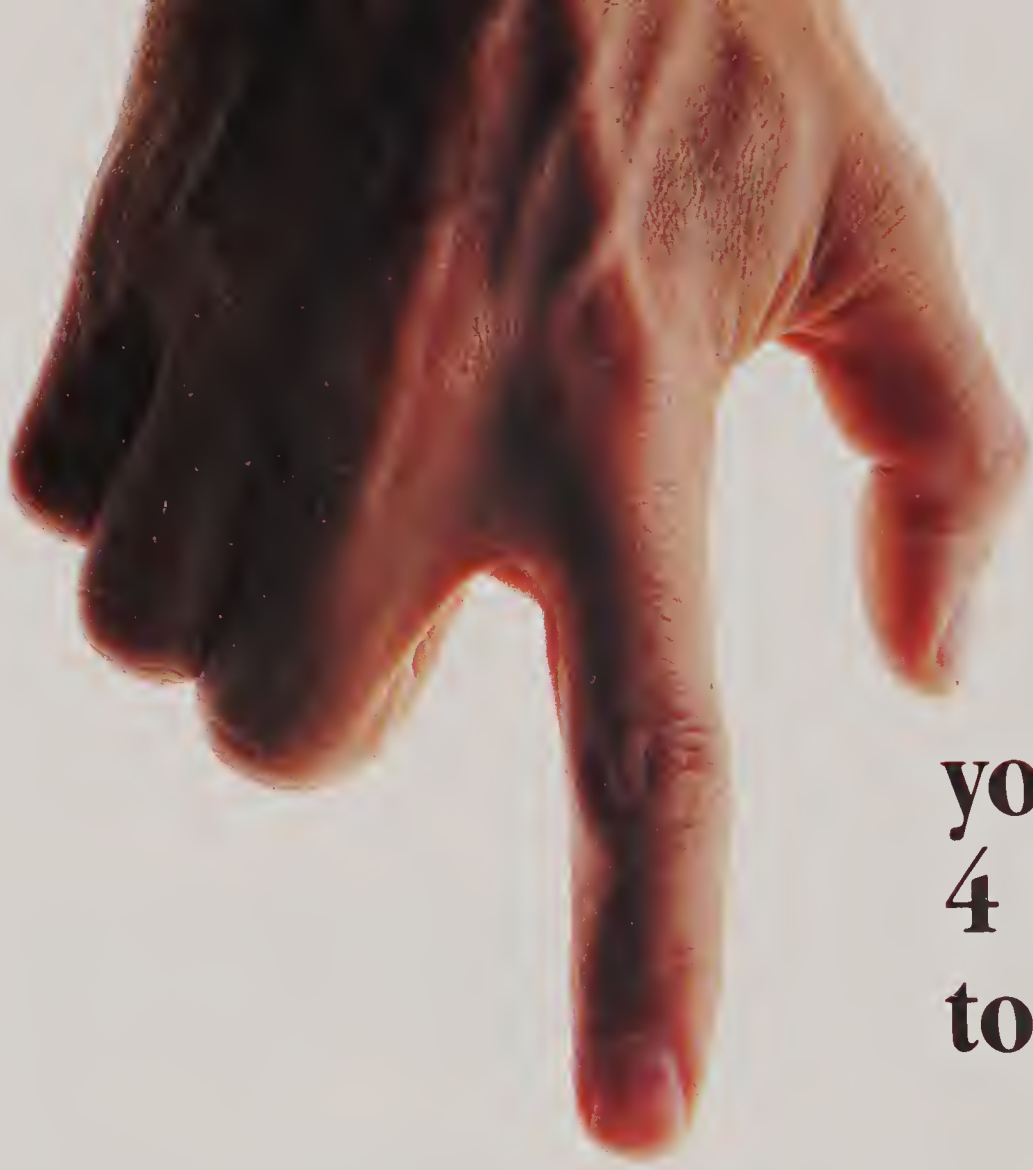

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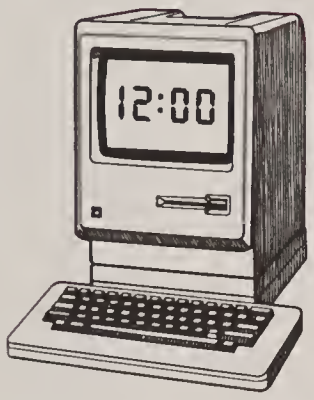

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sound, the volume, and the length of time I'm pressing the keys, and all this is stored in the Mac's RAM (or, if I save it, on a disk). During playback, the computer sends the information back through the MIDI Out cable, and the synthesizer translates it into sound. Just like the information that's stored in the form of a spreadsheet or word processing document, the musical data held by the sequencer is malleable. Once you record something, you can edit it, change the vibrato, make it louder, even transpose it to another key.

Instant Replay

Though I spent a lot of time playing with these functions, when I got down to playing "My Toot-Toot," I ran into some problems, especially in figuring out how to get two instrument sounds going at the same time. Eventually I concluded that while *MegaTrack* and *MIDI Mac* offer a variety of features that professionals need, Casio CZ-101 beginners might be frustrated by the resulting complexity. After talking to executives from both companies, I realized that the limitations of the Casio are part of the problem. The CZ-101, unlike its expensive counterparts, supports only a few patches at once. In fact, if you want to record a song with four tracks playing at the same time, you must use the synthesizer's solo mode, which means you can sound only one note at a time. So much for fancy chording.

Then I booted another sequencer program, the $139 *ConcertWare+MIDI,* by Great Wave Software. The program has three components: Music Writer, Music Player, and Instrument Maker. I first tried Music Player; I loaded one of the prerecorded selections, Beethoven's Fifth Symphony, put my earphones on, and waited.

I see a lot of Macintosh software, much of it very good. But only a few programs a year pass the Jaw Drop Test. When something so wonderful occurs that my mouth involuntarily gapes, the test is passed. When *ConcertWare+MIDI* played Beethoven's Fifth in four parts, it was impressive, and it was cute that the screen had a little picture of a conductor surrounded by icons of four instruments. But when the instruments began changing—viola to piccolo, tuba to flute—and the icons switched along with them . . . well that was so Mac-like, in the best sense, that my chin almost hit my neck. I determined to produce a "Toot-Toot" on this software.

ConcertWare+MIDI was a felicitous choice because its default settings are geared specifically to the Casio CZ-101. It was easier to do multitracking than with the other sequencers, which really weren't happy unless paired with something like a $2000 Yamaha DX-7. Another benefit of this choice: in the Music Writer mode, in which recording and composing occur, the keyboard input is translated to musical notation. This, I figured, would be very helpful when I was a rock 'n' roll star writing hit tunes so fast I would need instant transcription for my publishers.

Since *ConcertWare+MIDI* is actually an enhanced version of a program that is designed without MIDI (the plain old *ConcertWare+* program requires no synthesizer, though it does accept input from the low-cost MacNifty keyboard), some parts of the program were superfluous for my task. Also, I found that the manual bordered on cryptic when I sought instructions for some things I wanted to attempt. But since the program followed the Macintosh interface so well, I was able to experiment, and it didn't take long before I was

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OverVUE. Best Database of the Year.

Choosing a database manager is no easy task. It's by far the most confusing and fiercely competitive field in Mac software. But now your buying decision is crystal clear, because the editors of MacUser and the readers of MACazine have both selected OverVUE as the Best Database of the Year.

Said MacUser (Jan. 1986), in selecting OverVUE for its **Editors Choice Award:** "OverVUE 2.0 is a deceiving program in that the more you use it, the more you realize what it can do. Power, speed and logical menus make this a dream database."

When MACazine (Jan. 1986) bestowed OverVUE with its **Readers' Choice Award,** they wrote: "We selected OverVUE because of its ease of use, clairvoyance and statistical capabilities. The fact that OverVUE was subsequently selected by our readers as Best Database simply confirms our original assessment: the product is a jewel and the customer support a bonus!"

OverVUE's clean sweep of these two prestigious awards only confirms what everyone else has been saying all along:

Infoworld (July 8, 1985): "...it is Macintosh software done right."

Icon Review (Fall 1985): "OverVUE 2.0 is our favorite database workhorse...it simply offers the best balance of power and ease-of-use available on the market today."

Nibble Mac (Oct. 1985): "OverVUE is not only easy to set up, it's the easiest for data entry. Its tools for entering repetitive data minimizes typing time."

Online Today (electronic version — Nov. 1985): OverVUE 2.0 is a heavy-duty data management tool...It does all the things a good relational database manager should."

OverVUE's features and power make it the ultimate database choice. Clearly, users and editors alike think OverVUE is something special. We think you will, too.

So visit your nearest software dealer and purchase your very own copy of OverVUE, the Best Database of the Year.

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able to lay down the basic "Toot-Toot" melody, which I had painstakingly picked out.

Since the heart of zydeco music is the accordian, I used the preset accordian patch, taking advantage of the editing capabilities to correct my numerous mistakes. For track two, I produced a simple percussion beat; it was easy, since I could hear the first track playing while I recorded the drum sound. On track three I recorded a simple bass line, using the synthesizer bass setting on the Casio. I wanted to add some guitar fills on track four, but that sound wasn't in my Casio. So I closed the program, found a good guitar sound in *Patch Librarian,* loaded it into the synthesizer, went back to *ConcertWare,* and, after some trial and error, composed some simple "guitar" lines to embellish the song.

Rockin' Steven

On playback, I realized that the bass part wasn't so great. So I turned off track three and repeated the song until I created a more suitable one-finger bass line. When I thought I had it, I rerecorded that track.

My finished product will not cause Rockin' Sidney sleepless nights. But it was a four-track, four-instrument rendition that was recognizably "My Toot-Toot." Of my subsequent experiments, I had the most success with jazzlike improvisations layered over some basic chord progressions. The nice thing about improvisations recorded this way is that you can go over them later and clean them up.

At least one of my questions was answered: the Macintosh and very little money can give you astonishing power. If my work were accomplished enough, I could take the disk files I created on the Mac straight to Electric Ladyland studios and put my instrumental parts on a hit record—all the recording studios use MIDI these days. If you buy a little MIDI synthesizer, the capabilities of a recording studio are yours.

The answer to my second question, concerning my future as a pop star, was less clear. After all, it's a long road from "Don't Mess with My Toot-Toot" to "Born to Run." And I have yet to actually compose any tunes to set the whole world humming. Until I do, don't look for me in the Who's Hot issue of *Rolling Stone.*

Macworld *Contributing Editor Steven Levy wrote* Hackers: Heroes of the Computer Revolution *and is a contributing editor of* Rolling Stone. □

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PL SERIES

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These are the fastest SCSI hard disks available for Macintosh Plus or Macintosh 512. The main features include plated media hard disks for long reliable use. The PL hard disk is auto-booted either from the Macintosh Plus or the Macintosh 512/E with our Macport+. Each unit comes equipped with its own fan for optimum operation and extended product life. Also the PL series comes with a complete set of utilities to format and park the disk. Each PL drive can be placed either underneath, next to the Macintosh, or up to 20 feet away, how's that for versatility? The PL can be daisy-chained with 6 other peripherals, and is available in various capacities.

PL 20, 21meg formatted drive/**PL 30,** 32meg formatted drive/**PL 80,** 80meg unformatted drive/**PL 172,** 172meg unformatted drive.

MacBack+

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MacBack+ SCSI tape back-up units are what every SCSI hard disk has been waiting for. The SCSI experts from Peripheral Land deliver again. The wait is over! Now, finally, a fast, easy, and reliable way to back up your Peripheral Land hard disk drives, or anybody's SCSI hard disk.

Say goodbye to floppies and hello to 22 megabyte ¼'' tape cartridge. The MacBack+ can either back-up or restore 20 megabytes in 8 minutes. Now that's how you spell relief and security for your precious data. The MacBack+ is available in either 22 or 60 megabytes of awesome capacities.

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The MacFast SCSI series is our top of the line hard disk for the ultimate Macintosh power user who demands speed from the hard disk. What makes the MacFast hard disk superior? An 8k buffer that maximizes raw data transfer on the SCSI bus to its fullest potential. A Turbo-Stream disk/tape controller that has its own Zilog Z-8 microprocessor with DMA that optimizes data transfer at a phenomenal 5 megabytes nonstop per minute between the MacFast disk and MacBack tape unit. The MacFast runs HFS and MFS volumes simultaneously when formatted with partitions. No competitor can come close to our MacFast performance. In fact, we challenge our competition to beat our capabilities, because we know no one will . . . Remember, We Are the SCSI Experts.

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(QIC-02) High-performance Tape Back-up Unit

Our companion tape back-up system for the Mac Plus. Our Turbo-Stream technique has the ability to back-up and restore 20 megabytes of data in a blistering 4 minutes. In the 5 megabyte volume mode, MacBack will back-up or restore in exactly one minute, incredible but true.

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Auto-booting SCSI Adaptor for the Macintosh 512 and 512/E

Here's where Peripheral Land expertise really shines. An auto-booting SCSI adaptor for the Macintosh 512 or 512/E with the new 128k rom. This easy, convenient upgrade provides full SCSI compatibility with our hard disk or any other SCSI hard disk. Now, you can boot directly from the hard disk, just like the Macintosh plus, without modifications to your Mother Board or cabinet. The Macport adaptor snaps on to the Mother board without any soldering, or special modifications.

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Circle 509 on reader service card

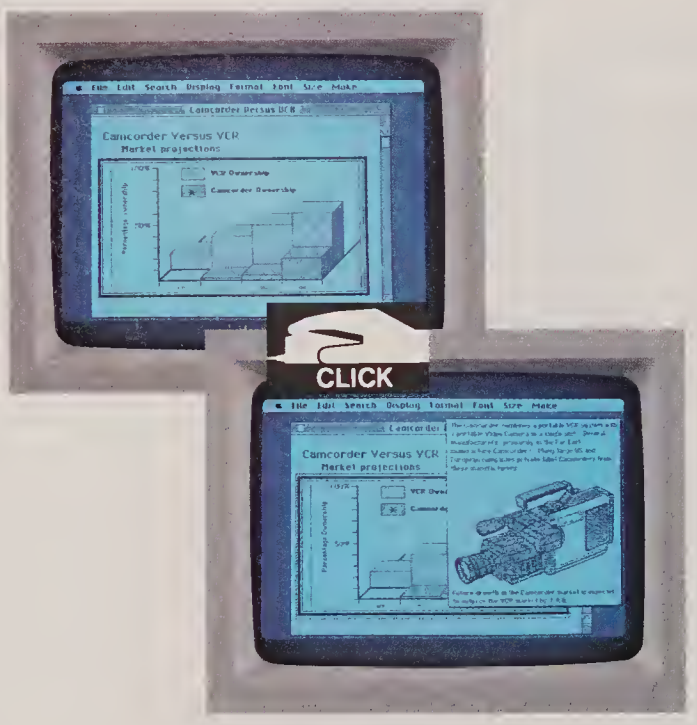
Guide takes the hype out of Hypertext

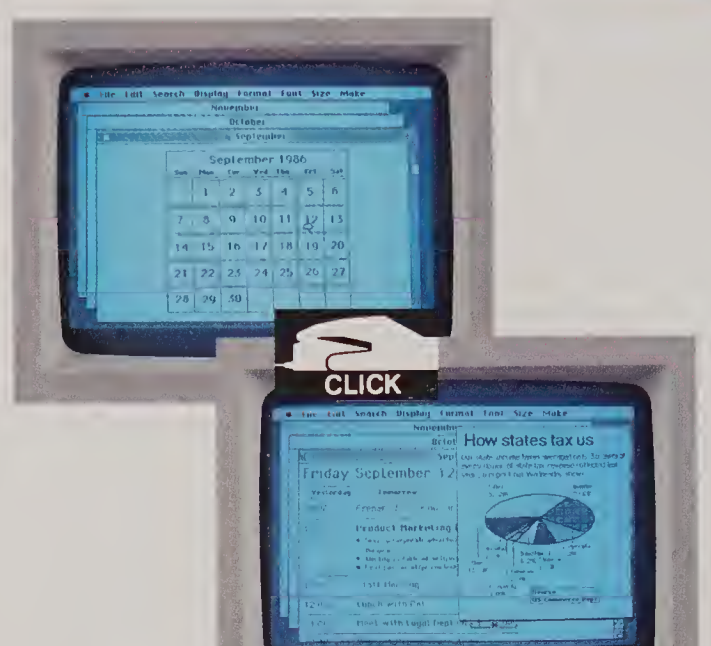
Guide is the first hypertext system designed specifically for the Macintosh. Now you can direct the power of the Mac with the most innovative principles of hypermedia for your personal information management.

Move through information at the speed of thought.

Guide provides virtually limitless flexibility in storing, retrieving and assembling electronic information. Unlike outline processors that force you to structure information according to a rigid format, Guide allows you to flow naturally through stored text.

Rather than emulating a printed page, Guide is designed to take advantage of the computer screen by allowing any number of windows containing graphics and text to be displayed. When windows are resized, graphics are automatically proportioned and text is reformatted instantly. Any displayed window can be activated and worked from.





Information management that's as flexible as you are.

A click of the mouse at any user-defined point in a body of text and a more comprehensive level is created on the screen for storage or retrieval of information, cross references and notes. If your Guide document cross references another document, Guide automatically opens a new window for it. Guide lets you tailor your information system to suit you…not some programmer.

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- build a scheduling calendar with whatever level of detail you require. Cross reference meetings with relevant documents. Click on any date and see your agenda for that day along with other pertinent information.
- create a graphics Guideline with MacDraw or MacPaint. Click on different parts of your graphic and create new levels of information or open other documents containing cross-referenced information.

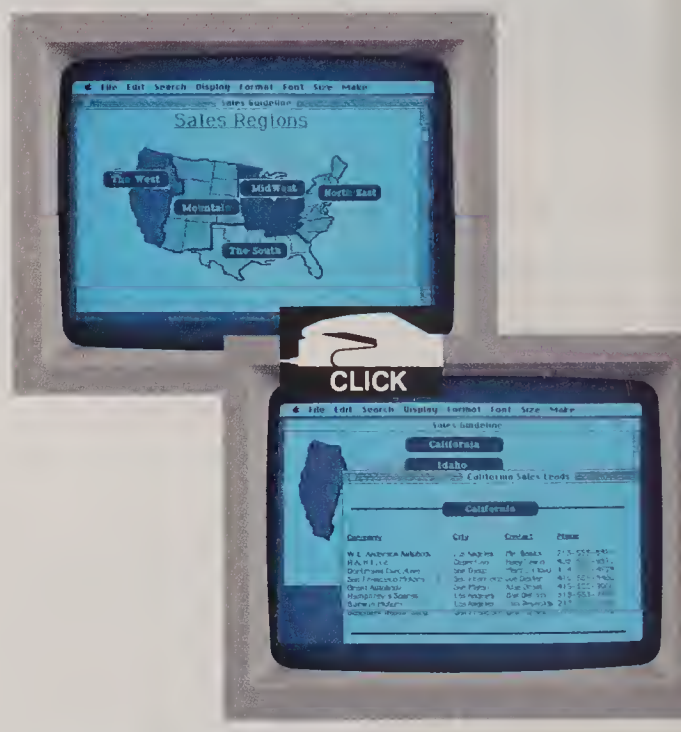
Use Guide for product specifications, research reports, personal information, legal documents, technical documents, electronic correspondence and a lot more.

Enhancement for desktop communications.

Guide brings a new dimension to desktop communications. Use Guide to create any type of electronic document for desktop publishing, electronic mail, creative writing, researching, etc. Guide supports MacWrite, MacPaint and MacDraw. You can print anything that can be configured on your screen.

Easy to learn…easy to use…easy to buy.

Guide is a program that you can learn while you use it. Four cursor patterns and six screen devices are all you need to know. It is 100% Mac honest. You can start using Guide immediately for your information management.



Suggested retail for Guide is $134.95 but if you respond before Nov. 15, you can put Guide to work for only **$99.95** (includes Mini-Guide desk accessory).

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Letters

Readers sound off on printing, word processing, financial modeling, and more

MARK ULRICH

Cause and Effect
Although impressed by the quality of *myDiskLabeler* from Williams and Macias, I found the copy protection a real hindrance. In a moment of frustration, I wrote a letter suggesting that the authors improve a very good product by removing the copy protection.

I expected the usual reply: "Unfortunately at this time our policy. . . ." Today one of the authors called to say they had received enough similar feedback from users that they are removing all copy protection from future releases. Here's a company that not only listened but responded both with a phone call and with real action.

Rudy Rugerbregt
Santa Clara, California

Monogram, publisher of Dollars and Sense, *also dropped copy protection recently. Because copy protection generally obstructs the efficient use of a hard disk, the clamor of user complaints has grown to a din. This year in the IBM PC arena, in fact, software publishers seem to be responding to pressure in the marketplace by backing away from copy protection. Microsoft, for example, has removed copy protection from all of its PC-DOS products, though Mac products remain locked up tightly.*

By the way, the telephone number for Williams and Macias was incorrect in some recent ads; the correct number is 800/752-4400.—Ed.

Learning by Doing
In his letter "A Learning Experience" in the May *Macworld,* Frank D. Mathon expressed regret and surprise that not much educational software has been written for the Macintosh. I hope that by now Mr. Mathon has realized that just using the Macintosh is an educational experience.

Writing as a former computer science teacher, I feel that students are usually happier and learn more when they use application programs (such as word processors or spreadsheets) rather than drill-and-practice programs.

Sue Knopf
La Crosse, Wisconsin

Straight from the Printer
I enjoyed your article about the ImageWriter II. It was well written and covered the product's features quite thoroughly. However, all ten of the ImageWriter II printers where I work print crookedly; the fonts look as if they were being viewed through water, especially in Standard quality. This is most obvious on printed borders, such as those used in *Microsoft File,* in which the dots do not line up.

Vicky Jo Varner
Los Angeles, California

Users say that version 2.2 of the ImageWriter driver clears up the problem. Apple reports that the earlier printer drivers had the ImageWriter print bidirectionally in Standard quality, which might account for the misalignment.—Ed.

A Monkey Wrench in the Network
Earlier this month our newspaper completed installation of a network system consisting of six Macintosh computers, a LaserWriter, a Corvus hard disk, and Omninet network hardware and software.

Although the Macintosh Office has worked well for all aspects of our publishing, you can imagine my chagrin when I learned that Aldus's *PageMaker* program does not complete a print operation over the Omninet system. That's why we set up the system in the first place.

Eric Petermann
Delavan, Wisconsin

Omninet's print spooling does not work with PageMaker. *You can attach your six Macs with Omninet, but to send a* Page-

(continues)

Hot Problem

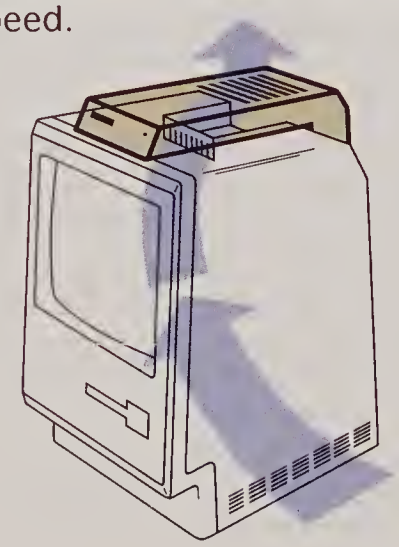
Introducing System Saver® Mac.

Ever put your hand on top of your Macintosh™ after it's been running a while? Pretty hot, isn't it? And that's a problem.

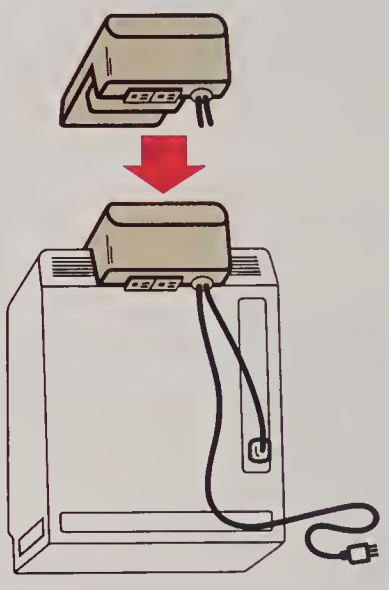
High temperature conditions can affect your computer's circuitry. Even shorten its lifespan. That's why we developed the System Saver Mac.

System Saver Mac keeps your Macintosh cool.

The System Saver Mac's quiet fan draws a breath of fresh air in through the ventilation slots on the bottom left and right sides of the Mac, across the circuit board, over the power supply (the primary source of heat), and out the top ventilation slot (the one hidden under your Mac's handle) at the rate of 17 cubic feet per minute. It leaves your Mac cool, calm and running at top speed.



System Saver Mac stops the scramble for power.



No more reaching around to the back of your Macintosh to turn it on. No more fumbling for spare outlets. System Saver Mac organizes all your power needs. It provides outlets for two peripherals (like your printer and modem), while replacing the Mac's power cord.

Cool Solution

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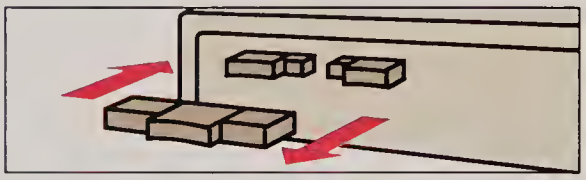
System Saver Mac has a great switch play.

System Saver Mac comes equipped with two switches – important for those of you who want to power one of your peripherals separately. For example, if you use a Hard Disk 20, you have to power up your hard disk first, before you turn on your computer. Just use one of the System Saver Mac's switches to control your hard disk and the other for the rest of your system.



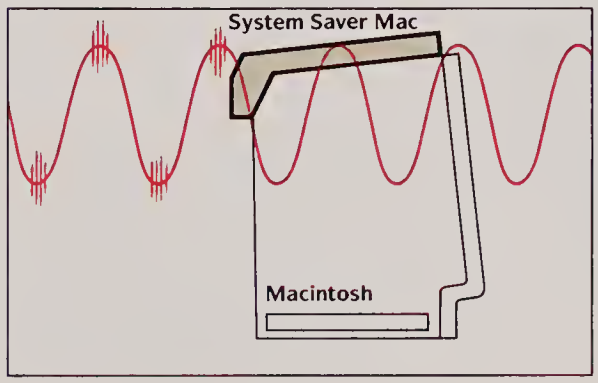
Of course, we realize that many of you would prefer the convenience of a single switch to control your entire system. That's why every System Saver Mac also comes with a special single switch cap. Just pop off the two separate switches and pop on the single one provided.

"See Us at Macworld Expo Booth #532"

System Saver Mac provides pure power.

70-90% of all microcomputer malfunctions can be traced to impurities in the electrical current. Line noise can be interpreted as data, confusing your Macintosh and causing annoying system errors. Power surges and spikes can do costly damage to its delicate circuitry.

System Saver Mac clips surges and spikes at a safe level and filters out line noise. It provides pure power to make your Macintosh more accurate, efficient and reliable.



System Saver Mac is not a completely new idea.

Clever, yes. Versatile, convenient and useful, yes. But not completely new. After all, we've been making the original System Saver for years. It's the best selling accessory ever made for the Apple II–chosen by over 1/4 million Apple II owners. We thought you'd agree–Macintosh owners deserve the best, too.

System Saver Mac, $99.95, is available from Apple dealers everywhere. For the dealer nearest you, or to speak to a Kensington sales representative, call toll-free 800-535-4242. In NY 212-475-5200.

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Maker *document from one of the networked Macs to the LaserWriter, you have to connect the Corvus OmniDrive to the LaserWriter via AppleTalk. Print spooling for the LaserWriter does work with* PageMaker *on 3Com's 3Server. In addition, the current version of* PageMaker *is not meant as a multiuser product; a multiuser update is scheduled for release this year.—Ed.*

HFS Software Incompatibility

I was impressed by your two articles on the new Macintosh ("A Change for the Plus" and "Developing a Megabyte Strategy") in April 1986 but was puzzled by an omission.

"A Change for the Plus" was the most thorough treatment I've seen of exactly what you get with a Mac Plus, but although it was accompanied by fair coverage of support for the new computer by hardware manufacturers, it failed to even mention software.

Donald F. McLean
APO San Francisco, California

Take a look at the follow-up article, "Order out of Chaos," in the May 1986 Macworld. *Software compatibility is an issue any time system software changes. If you're considering upgrading to the Mac Plus, consult software publishers to make sure that the applications you count on run trouble-free on the Mac Plus.—Ed.*

The Mac's Two Word Processors Can't Make the Grade

In his April column David Bunnell remarked, "If the Mac has already become the computer of choice in universities. . . ." No doubt about it, but how many thousands of my colleagues have reluctantly had to give up their choice because of a fact so simple that it is hard to believe that none of the masterminds of software have become aware of it: neither *MacWrite* nor *Microsoft Word* is even remotely adequate for preparing scholarly papers or books.

To be sure, a perfect program for bibliography (*Professional Bibliographic System*) has now been adapted to the Mac. But it's expensive. When can we expect suitable word processing software for the Mac?

Blake Lee Spahr
University of California
Berkeley, California

More word processing variety is on the way, as reported in Macworld View, *July 1986. Next month we'll go into greater detail on the new writing tools for the Mac.—Ed.*

Terminal Confusion

"Mini and Mainframe Connections" (*Macworld,* July 1986) reviewed a version of *Tekalike* that has been obsolete since December 1985.

Most significantly, *Macworld* printed the wrong phone number. The correct number is 505/672-1998.

Tekalike now emulates the VT-100, the VT-640, and the Tektronix 4105 as well as the Tektronix 4010, 4012, 4014, and 4016. Printing is supported to the resolution of the output device, with direct support for the LaserWriter and high resolution for the ImageWriter. *Tekalike* generates *MacDraw*-compatible PICT files from mainframe graphics, for use in *PageMaker, MacDraw,* or *MacDraft.*

Plotting has been enhanced with multiple plots on a page and additional plotter

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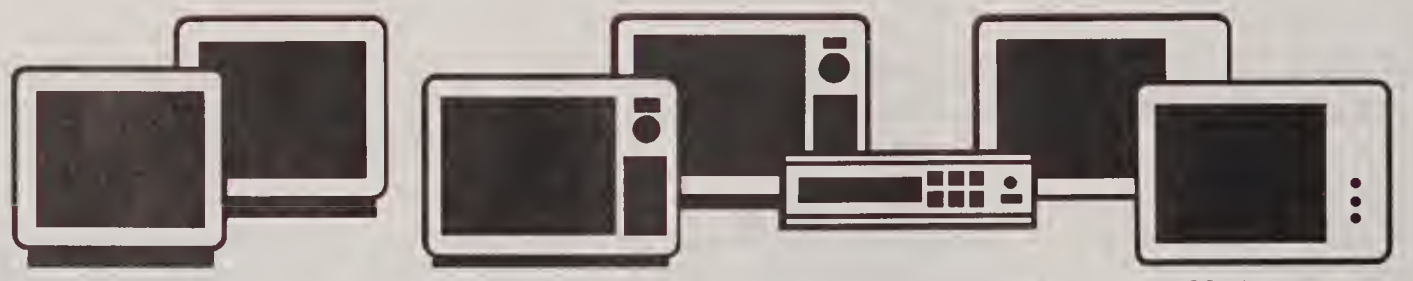
Turn Your Mac Into A Presentation Center



The Mac Video Scan Converter enables video data from the Mac or Mac Plus to be simultaneously presented on a variety of low cost or high performance displays including NTSC or IBM monitors, TVs and VCRs.

It is intended for use in audio/visual displays such as classroom demos or to provide a convenient portable demo by storing the presentation on a video tape for use with a VCR.

An easy installation kit is available and requires no soldering. Installation will not void Apple Warranty.

The unit features:

- **Freeze-frame screen memory**
- **Video frame advance**
- **Inverse video**
- **Compatibility with all Mac Software**

Display Device	Video Output	Typical number of devices per output*
NTSC Compatible Monitor	Composite/ NTSC Video	10 Monitors
TV Monitor**	Composite/ NTSC Video	10 Monitors
VCR** (VHS & Beta)	Composite/ NTSC Video	1 VCR
IBM Compatible Monitor	IBM Compatible Video	5 Monitors
High Speed Compatible Monitor (22.25 KHZ Horizontal scan rate)	High Speed Composite Video	10 Monitors
Color Monitor (RGB)	RGB Video	5 Monitors

*Maximum number of devices per output is a function of device type and impedance.

**May require use of RF Modulator.

Note: The two Composite/NTSC outputs are identical.

Each output will drive a number of specific display types (please see chart on the left) and will operate simultaneously.

Distributor and Dealer inquiries invited.

For further information please call:

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Of course, the best way to solve problems is to prevent them. That's why we make a complete line of Cleaning Kits and Dust Covers for your Mac.

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your numbers, Insight analyzes and interprets them for you. So you can make critical decisions that determine your company's destiny. Easier. Faster. More accurately.

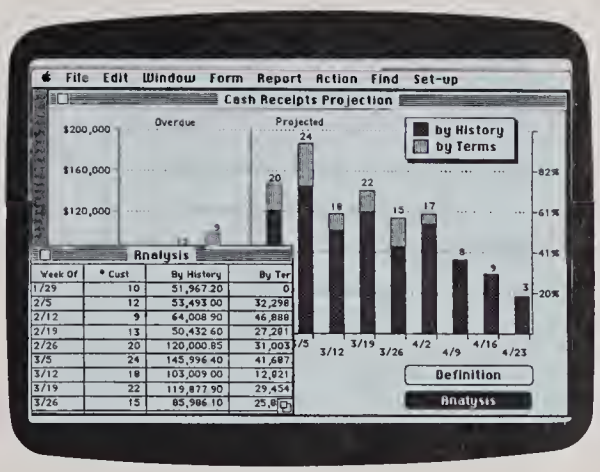
Insight achieves this through Expert Reports. A unique process developed by Layered that analyzes and explains information such as current ratios, quick ratios, inventory turns and cash flow. Viewed right on the screen, they let you compare last

Insight not only analyzes your results, it explains who is watching them and why. Insight interprets your performance, describes business factors affecting it, and finally recommends actions you can take.

year's performance, current year-to-date, and even how you're doing compared to your industry.

All this allows you to quickly understand where your company is, project where it's going, and what adjustments you should consider.

Insight's Expert Reports calculate and interpret trends in your sales, costs, and expenses. So you can better manage and project revenue, expenses, assets and liabilities. Assess



Insight projects cash receipts "intelligently," based on when your customers actually pay you, not when they're supposed to. You can zoom from the big picture graph to a weekly list of payments to individual customer invoices. And Insight's analytical report summarizes all this for you – so you can meet your banker with confidence.

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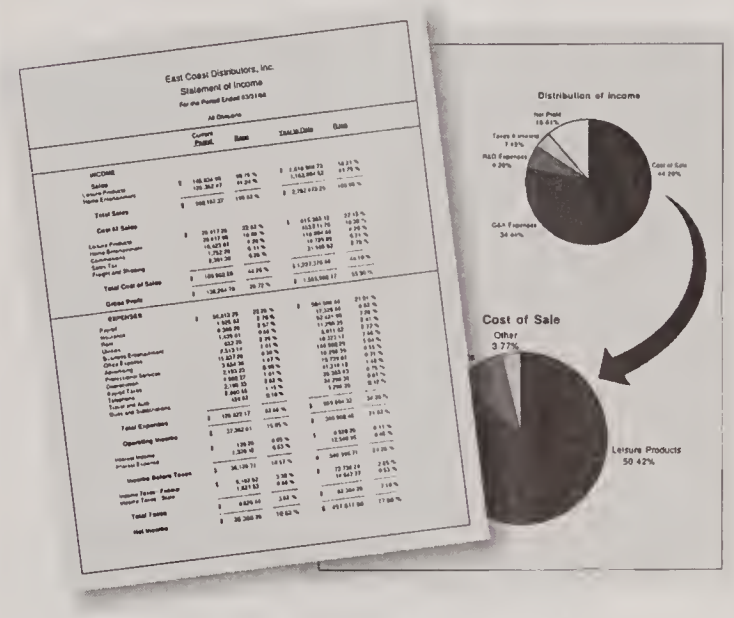

Insight has the power and flexibility of a spreadsheet, so you can generate any financial statement you need when you need it. Then, you can view key relationships that you might otherwise miss with Insight's built-in graphics package.

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support: Hewlett-Packard ColorPro and Houston Instrument DMP51/52.

Tekalike is hard disk compatible and supports the Macintosh File System, the Hierarchical File System, and *Switcher.*

James E. George
President, Mesa Graphics
Los Alamos, New Mexico

Letter-Quality Bomb

Since letter-quality correspondence is crucial to my business, I wanted to make sure the Macintosh Plus was compatible with the Brother printer I use with my 512K and *Microsoft Word.* The local dealer brought a Mac Plus to my office, along with a copy of *Word* he said Microsoft had requested accompany the new Mac. To my astonishment, the program bombed when I set it to Brother printer. How can Microsoft have the audacity to supply free of charge an application that does not work properly?

C. Claude Dawson II
Greensboro, North Carolina

A Microsoft representative explained that the Word *on the disks dealers supply with the Plus is the same version (1.05) that works so well on your 512K. Microsoft says the problem lies with Apple's system software for the Plus. System 3.2 and Finder 5.2 should solve the problem.—Ed.*

Can This Marriage Be Saved?

Some marriages are made in heaven, but the match of the Mac to a Hewlett-Packard LaserJet is certainly not one of them. In fact, the two immediately present the user with irreconcilable differences. I didn't realize that I'd need special software to make the LaserJet work. After buying a copy of Softstyle's *Laserstart,* I finally was able to print. However, the quality was disappointing—inconsistent spacing between words, descenders of letters inexplicably cut off, and ragged letters even in high quality. I was naive and made a costly mistake, but now I'm trying to arrange a divorce through classified ads in the newspaper.

Barbara Slater
St. Louis, Missouri

Bob Canaday, of technical support at Softstyle, says that most, if not all, of your problems could be avoided by taking pains to compose your document on the screen in a font that is compatible with the font you intend to print in. Match point size to point size, proportional type to proportional type, and so on. To simplify the matchup, Softstyle is issuing an upgrade to Laserstart *that provides four screen fonts that translate directly to LaserJet printing.—Ed.*

Another Dimension to MacSpace

Some of the strongest points of our *MacSpace* program were not mentioned at all in "3-D In Depth" [*Macworld,* June 1986].

Moves. Because the program creates vector-based documents, you must specify an origin and an endpoint for objects moved. The review says this is a nuisance, but professional draftspeople are accustomed to working with vectors.

Rotation. True, in the case of a complex object it becomes difficult to rotate parts independently, but the table made it appear that no rotations are possible. In fact, the program offers rotations in any increment.

Accuracy. Drawings are done in real dimensions, with an accuracy of up to six digits to the right of the decimal point.

Zoom. An unlimited zoom allows users to work accurately on very small details or very large structures.

(continues)

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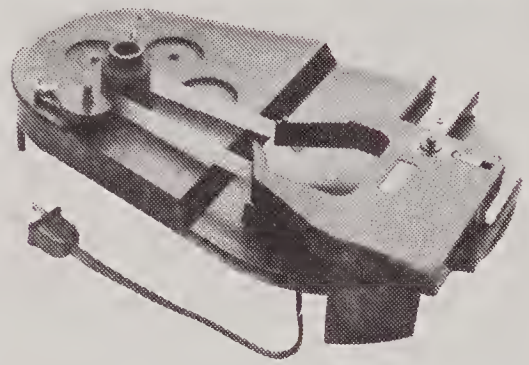

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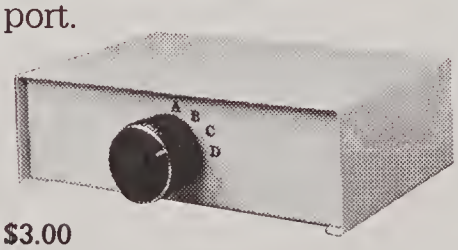

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Coordinates. X, y, and *z* coordinates are always available. Users enter absolute and relative coordinates with the mouse or the keyboard and input angles in the same fashion.

Existing point. MacSpace allows the user to position the origin of a vertex exactly on a point that has already been drawn; this procedure lets the user place one object precisely next to another without trial and error.

Perspective. The program offers true perspective with three vanishing points—the same type of perspective used in isometric drawing.

We try to produce professional CAD programs that novices can use. Perhaps your reviewer failed to mention assets of our program because he did not fully understand our product.

J. Louis Martin
President, Abvent
Santa Monica, California

When we condense our experience with a product into a review, we are often forced to omit mention of some features. On moving and rotation, your point is well taken; our table oversimplified matters by saying neither was possible, though the text of the review stated moves sometimes require painstaking effort.

When a product is directed to both novices and pros, ease of use is important. Vector-based design may be familiar to professionals who have worked on high-end CAD workstations, but the Mac brings 3-D drawing tools within reach of users who lack such experience.

An upgrade of the program is now available ($20 for registered owners) that removes hidden lines, supports high-resolution printing with the LaserWriter, and adds editing options. Another version (available at a discount to registered owners of MacSpace*) is on the way for professionals; it includes features such as six layers of drawing, the ability to enter text, a library of objects, real-time rotation, and a way to convert free-hand drawings to elevations.—Ed.*

Don't Desert the Apple Corps

David Bunnell's concern ["The Macintosh Today and Tomorrow," April 1986] that Apple may have been considering dropping the 512K Mac to concentrate on pushing the Apple II was frightening to say the

(continues)

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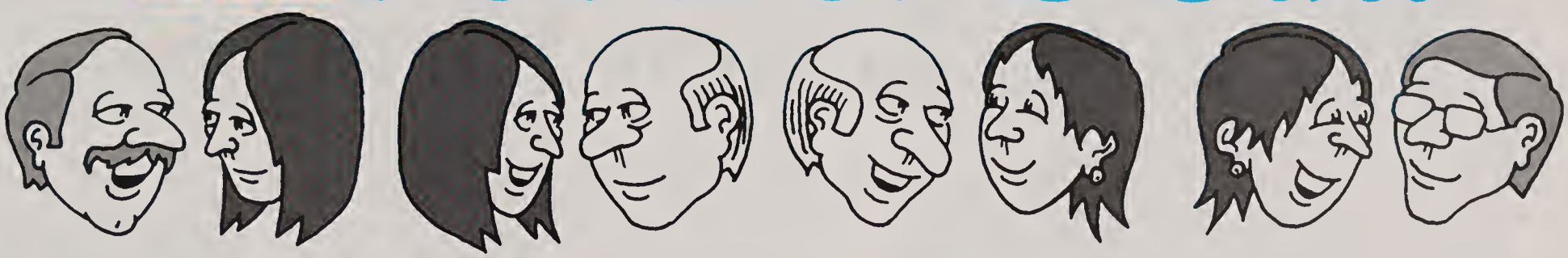

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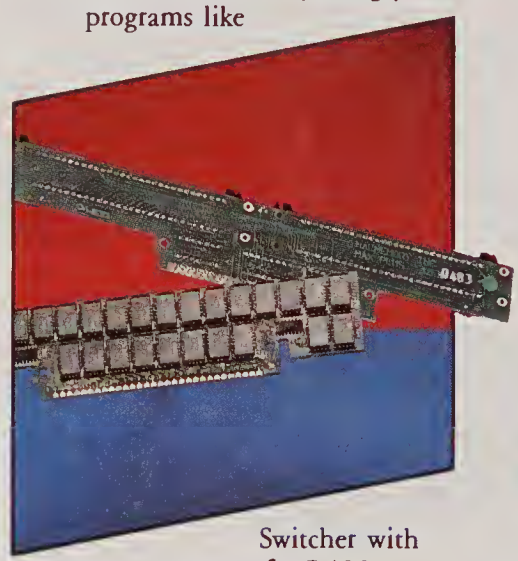

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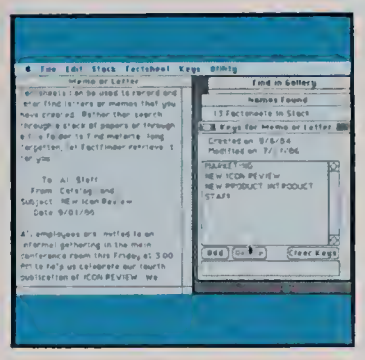

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From MindWork Software **$49**

Factfinder is one of our favorite, indispensable tools. Unlike database programs. Factfinder is designed to store and organize text, notes, and other free-form information that might otherwise clutter your desk with scraps of paper. While taking notes, for example, you simply type a note into a factsheet, name the factsheet, select the keywords by which you will retrieve it, and save it to disk. Later Factfinder can sort through all your note factsheets and retrieve them individually by name, keyword, or date created or modified. Factfinder is a must for every researcher, writer, student, teacher, and professional.

Bernoulli
Boxes From Iomega

Iomega's Bernoulli Box mass storage devices for Mac Plus offer a fast, reliable, and cost-effective solution for any office. These Bernoulli Boxes work off the Mac Plus' SCSI port, allowing auto-boot, HFS support, lightning-fast speed, and daisy chaining with other SCSI devices. Average access time is 35 milliseconds, with a data transfer rate of 1.13 megs/sec. The unlimited data storage and efficient backup provided by 10- or 20-megabyte removable data cartridges put the Bernoulli Boxes in a class by themselves. While your drive stays in place, the data is highly portable and easily stored for optimum flexibility.

10 Meg Single-Cartridge Drive	$1499
10 Meg + 10 Meg Dual-Cartridge Drive	$2099
20 Meg Single-Cartridge Drive	$1899
20 Meg + 20 Meg Dual-Cartridge Drive	$2699
10 Meg Cartridges (3pk)	$169
20 Meg Cartridges (3pk)	$219
Head Cleaning Kit	$75

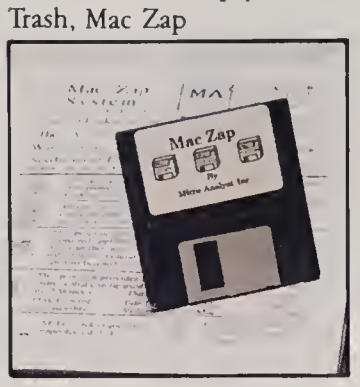
Electric Checkbook
From State of the Art **$29**

Electric Checkbook is a personal financial manager that handles up to five bank accounts on a 128K Mac or ten on a 512K. Define categories for income, expenses, assets, and liabilities. Reconcile bank statements and checkbooks, calculate profit and loss, and determine net worth. Use a special "What If?" feature to see the effect of a payment schedule before

implementing it. You can even print your checks on continuous forms. (Sample checks and order forms are included.)

Mac Zap
From Micro Analyst **$39**

If you mistakenly throw out a file and empty the Trash, Mac Zap



can retrieve it! It can even resurrect your hard disk or a crashed floppy that the Mac wants to reinitialize. And Mac Zap is a superior disk copy and software-backup program – copying master disks and moving protected programs to hard disk. Use Mac Zap to plumb the depths of your Mac – it disassembles applications, searches memory or disk blocks, compares disks, analyzes disk structure, and performs full-screen edits.

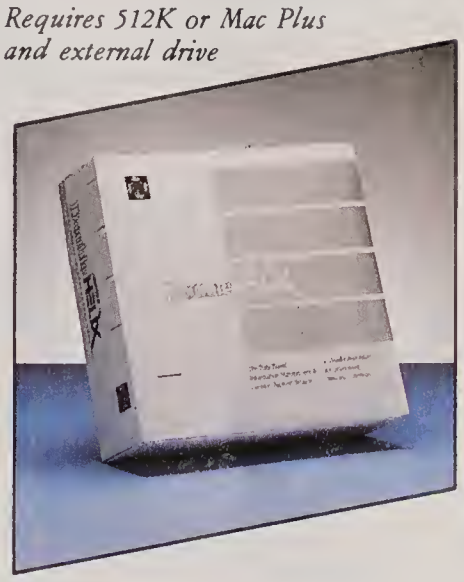
Mac Plus compatible

Double Helix
From Odesta **$289**

Double Helix packs double the punch you've come to expect from Odesta. Expanded power, flexibility, and ease of use make this the relational database for professional information management.

Double Helix features: the ability to create customized pull-down menus; three levels of password protection; subforms for easy invoices and powerful reports; expanded data import/export; many new user-oriented additions and modifications; global delete; speed and statistical optimization; compatibility with the Mac Plus, LaserWriter Plus, and HFS; and Odesta's excellent technical support.

Requires 512K or Mac Plus and external drive



ORDERS 800/228-8910
CALIFORNIA 800/824-8175

BUSINESS

Aegis
Doug Clapp's Word Tools $45
Checks text for punctuation, wordiness, and more

Blyth Software
Omnis 3 Plus *SPECIAL* $289
Powerful relational database

Borland
PhoneLink & SideKick $59
Desk/phone/schedule organizer; dials for you, too!

Cricket Software
StatWorks $79
Great value with best statistical graphs

Execucom
MindSight $179
Business planning and decision analysis

Forethought
FileMaker $105

I/O Design
ColorChart *NEW* $32
Plot & print color charts, graphs

Layered
Excel Notes *SPECIAL* $42
Jazz Notes *SPECIAL* $42

Legisoft/Nolo Press
WillWriter *SPECIAL* $30

Living Videotext
ThinkTank 512 $99

Micro Planning Software
MicroPlanner Plus $295
Enhanced version; requires 512K

Microsoft
BASIC $89
Excel $229
Multiplan *SPECIAL* $107
Word *SPECIAL* $112
Works $225

MindWork Software
Factfinder $49

Monogram
Dollars and $ense *SPECIAL* $81
Forecast *SPECIAL* $41

Odesta
Helix 2.0 *SPECIAL* $99
Double Helix *SPECIAL* $289
Requires 512K or Mac Plus

ODS, Inc.
Consultant *SPECIAL* $109
Helps develop strategies, solve problems

Personal Bibliographics
Professional Bibliographic System $220
Simplifies creating/maintaining properly formatted bibliographies

ProVUE
OverVUE 2.0 *SPECIAL* $149
Fast, powerful, easy-to-use database
Mail Manager Template $29
Personal Finance Template $29
Templates for OverVUE

Real Data, Inc.
Templates for Multiplan, Jazz, and Excel
Financial Analysis $62
Real Estate Investment Analysis Version 5.0 $125
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Property Management Level I $175

Satori Software
Bulk Mailer $79
Enhanced version manages 40,000 names!

SoftStyle
Decision Map *SPECIAL* $75
Innovative decision support and modeling

Software Discoveries, Inc.
Record Holder *NEW* $42
A full-function file/data manager

State-Of-The-Art
Electric Checkbook *SPECIAL* $29

Symmetry
ACTA *NEW* $39
A desk accessory outliner

Telos
Business Filevision $199
Visual access to information

Think Technologies
Lightspeed C $139

ACCOUNTING

Chang Labs
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- Accounts Payable $99
- Accounts Receivable $99
- General Ledger $99
- 3 Modules *(All the above)* $249
- Inventory $199
- Professional Billing $199

Peachtree
Back to Basics
- General Ledger $89
- Accounts Payable $89
- Accounts Receivable $89

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MacSpace $249
Professional 3D CAD for Mac

Altsys Corp
Fontastic Font Editor $25

Ann Arbor Software
FullPaint $59

Casady Company
Fluent Fonts *SPECIAL* $29
Fluent Laser Fonts $49
Six types disks available; call for details

Challenger Software
Mac 3D *SPECIAL* $119

Cricket Software
Cricket Graph $129
Plots 20 times more data points than Excel!

Datafood Software
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Requires MacDraw
MacForms *SPECIAL* $42
Requires MacPaint

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Indexed clipart accessed as Desk Accessory

Enabling Technologies
Easy3D *SPECIAL* $59

Innovative Data Design
MacDraft *SPECIAL* $139
Most powerful drafting tool for the Mac

I/O Design
ColorPrint $25
Print your graphics in color!

Living Videotext
More *NEW* $CALL
Outlining with presentation graphics

Manhattan Graphics
ReadySetGo 2.1 *SPECIAL* $99
Best value in page processing—fast, flexible, and powerful!

Silicon Beach Software
Accessory Pak #1 $21
Silicon Press *SPECIAL* $42
Makes color labels on your ImageWriter II

SoftStyle
Colormate $59
Print MacPaint, other documents in color
Colormate Art $29
Colorful clipart library

Springboard Software, Inc.
Art a la Mac *NEW* $29
More than 600 clipart pictures

Symmetry
PictureBase *SPECIAL* $48
Organize your picture files for easy access!

T/Maker
ClickArt Effects $27
Add tools to MacPaint
ClickArt Letters $27
ClickArt Personal Graphics $27
ClickArt Publications *NEW* $27

MUSIC

Kette Group
MacNifty Sound Digitizer $99
MacNifty Stereo System $75
New version—better sound—includes speakers
MacNifty Studio Session $69

HOME

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Dinner at Eight $35
Silver Palate Collection $29
Now Mac plans gourmet meals

X-10
Powerhouse *NEW*
Computerize appliances for convenience & security
- Appliance, Lamp & Wall Modules $15 each
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- Computer Interface $69
- Controller $9
- Thermostat Control Set $69

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SmoothTalker *SPECIAL* $49
Speller Bee *SPECIAL* $39

Great Wave
KidsTime $35

QED Information Services
Typing Made Easy $35

GAMES

Too many games to list all! Please call for prices of your favorites.

Broderbund
Ancient Art of War $29

Electronic Arts
Pinball Construction Set $27

Microsoft
Flight Simulator *NEW* $33

Psion
Psion Chess $31

Simon & Schuster
Paper Airplane Construction $23

Spectrum Holobyte
Orbiter *SPECIAL* $26

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Cortland
Top Desk $39

Dubl-Click Software
Calculator Construction Set $32
New low price!

Imagine Software
Smart Alarms $39
Integrates appointment book with alarms —flashes timely reminders for appointments

Target Software
MacLightning 2.0 *SPECIAL* $54
THE breakthrough design in spelling checkers; requires two drives
- Legal Dictionary $69
- Medical Dictionary $69
- Merriam Webster Thesaurus $33

Dictionary supplements require MacLightning

LoDOWN

Hard Disks
From LoDOWN

Here's our pick for the best value in a SCSI drive for the Mac Plus! Available in sizes to fit your needs and prices to fit your budget, LoDOWN drives are fast, reliable, and economical. LoDOWN has a well-ventilated case that needs no fan, and it contains a built-in surge suppressor. Daisy-chain as many as eight LoDOWNs for nearly unlimited storage.

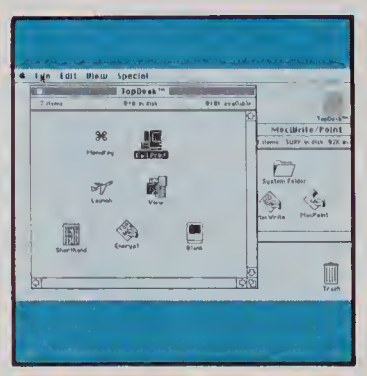
Add LoDOWN's T20 or T60 Tape Backup to ensure efficient, dependable backup.

Requires Mac Plus

20 Meg SCSI Drive	$895
40 Meg SCSI Drive	$1795
T20 Tape Backup	$795
T60 Tape Backup	$CALL

TopDesk
From Cortland Computer, Inc. **$39**

TopDesk contains seven easily installed desk accessories that add power and versatility to any Mac software. TopDesk lets you print high-quality text and graphics in the background while you work; see up to eight MacWrite documents at one time from within



any application for instant cut and paste; create macros for recalling long paragraphs and even entire Command-key sequences; define your own Command-key assignments for Menu selections; and much more. If you're looking for one answer to many needs, order TopDesk today.

Requires 512K, Mac Plus, or Mac XL

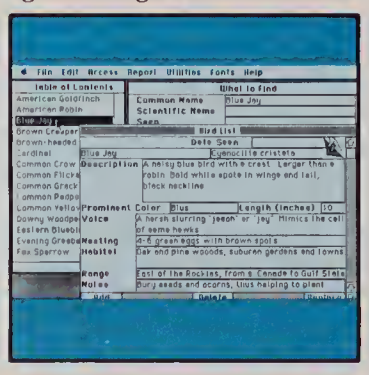
Fanny Mac
From Beck-Tech **$79**

Why risk losing valuable data by letting your Mac overheat when it's so easy and inexpensive to install Fanny Mac? Fanny Mac keeps your Mac cool and your data safe by reducing the operating temperature of your Mac as much as 50 degrees. Its compact design is elegant; Fanny Mac fits almost invisibly into your Mac's handle. And it installs in seconds with no tools. Its "pass through" power assembly means you

need only one power socket for both your Mac and Fanny Mac. And surge suppression for your Mac is built right in. Remember, the more memory and peripherals you have, the more heat your Mac generates. Get Fanny Mac to avoid system burnout.

Record Holder
From Software Discoveries, Inc. **$75**

Record Holder is a full-function file/data manager with more power than packages costing far more. The



concise manual and 100+ on-line help screens make Record Holder easy to learn and use. Flexible report formatting makes this database ideal for small- to medium-size businesses. Searches are fast and versatile; an unlimited number of fields or records are allowed in any file; and a unique Table of Contents allows instant access to all records in a file. Generate invoices and mailing labels with a click of the mouse. Another plus: Record Holder works on any Mac with any drive. Put Record Holder to work for you today.

New Owner's Kits
From Icon Review

If you're serious about getting the most from your Mac, these kits offer all the accessories you'll need. Save yourself time and money by ordering one of the comprehensive kits we've assembled. Each kit includes:

- **Eichner Disk Holder**—Model 1032 holds a total of 60 diskettes, two across. Internal dividers make it easy to organize disks.
- **Sony Diskettes**—A box of 10 disks, the best available for the Mac. Double-sided disks are shipped with the Mac Plus kit.
- **Mouspad**—Give your mouse nine lives with this 7″ x 9″ anti-static, foam-backed desktop mouse pad.
- **Dust Covers**—For Mac and keyboard. These well-tailored waterproof ripstop nylon covers offer important protection from dust and static.
- **MacTilt**—This ergonomic stand lets you adjust the height, angle, and rotation of your Mac with ease.

New Owner's Kit for 128/512K Macs with SS/DD disks	$132
New Owner's Kit for Mac Plus with DS/DD disks	$142

Buy a New Owner's Kit and save on the Ehman 800K External Drive a $199 value.

New Owner's Kit for 128/512K Macs w/Ehman Drive	$320
New Owner's Kit for Mac Plus w/Ehman Drive	$330

T-Maker Graphics
ClickOn Worksheet *SPECIAL* $45
Great for casual spreadsheet use

UTILITIES

Affinity Microsystems
Tempo $79
Powerful macros with logic branching

Central Point Software
Copy II Mac *SPECIAL* $18
Includes hard disk install

FWB Software
Hard Disk Backup $39
Hard Disk Utility $59
Removes software copy protection to install on hard disk

Greene, Johnson Inc.
Spellswell $45
New spelling checker catches capitalization & homonym errors too

Ideaform
MacLabeler $29
Enhanced version!

MacMemory, Inc.
MaxRAM/MaxPrint Disk *NEW* $33
Save time w/RAM disk & print spooler

Macromind
Macromind Utility Disk *NEW* $29

Micro Analyst
MacZap $39
Hacker's backup utility and more!

Nevins Microsystems
TurboCharger 2.0 $39
New, more powerful Disk Cache works with hard disks

New Canaan MicroCode
MacDiskCatalog II *SPECIAL* $33
Organizes your disk library

PBI Software
Hard Drive Backup *NEW* $39
HFS Locater *NEW* $29

COMMUNICATIONS

CompuServe
Starter Kit $25
FREE with Hayes Bundle

DataViz
MacLink w/8' Cable *SPECIAL* $109
Transfers and converts files between Mac and IBM

Hayes
Interbridge $CALL
SmartCom II *SPECIAL* $89
Smartmodem 1200 $CALL
Smartmodem 2400 $CALL
Smartmodem-to-Mac Cable $18
Please specify either 1200 or 2400
1200 Smartmodem, SmartCom & Cable (Bundled) *SPECIAL* $449
We add FREE CompuServe Starter Kit!
Transet 1000 *SPECIAL* $279
Multi-function buffer and switch—incredible!
Transet 1000 512K *SPECIAL* $379
Transet Mac Accessory Kit $29

Infosphere
MacServe $CALL
Partitions hard disk, network disk server, print spooler & more!

ProAPP
ProAPP Modem *NEW* $Call

Software Ventures
MicroPhone *NEW* $65
Best communications software!

Think Technologies
In-Box Starter Kit *NEW* $219
Includes 3 connections; send electronic mail over AppleTalk
In-Box Personal Connection $65

USRobotics, Inc.
Courier 2400 Modem *NEW* $419
Combines power, ease of use, and many special features

HARDWARE

Cuesta
90 Watt Datasaver $299
200 Watt Datasaver $399
Protection from power blackouts

Ergotron
MacBuffer 256K $249
MacBuffer 512K $375
MacBuffer 1024K $575
Hot new print buffer

Kensington
Surge Suppressor $34

Koala Technology
MacVision *SPECIAL* $169
Puts images from your video camera into Mac

MacMemory, Inc.
The MaxPlus $399
Upgrade your Mac Plus memory to 2 meg. Plugs into standard SIM sockets; includes Max Chill fan and software

Summagraphics
MacTablet 6″x9″ $299
MacTablet 12″x12″ $399
Absolute pointing device, great for tracing and drawing

Systems Control
Mac Gard *SPECIAL* $55
Protect your Mac from power surges

Thunderware
ThunderScan *SPECIAL* $175
Thunderscan Adapter Kit *NEW* $89
For MacPlus

DISK DRIVES

AST
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20 meg Winchester; 20 meg tape backup
AST-4000 $4900
74 meg Winchester; 60 meg tape backup

Ehman Engineering
800K External Drive $199

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MacTablet
From Summagraphics

MacTablet is the closest thing to a natural input device you can find for the Mac. It's ideal for graphics, perfect for sketching or tracing, and it's more precise and more comfortable to use than either a mouse or trackball. In fact, it's not unlike the expensive graphics systems long available only for large computers.

MacTablet can be connected to either the printer or modem port, and it includes easy-to-use 3.0 Version software. MacTablet works with all Mac software and comes in two sizes. The 6″ x 9″ size has a resolution of 500 lines/inch; the 12″ x 12″ size has a resolution of 1000 lines/inch.

6″ x 9″ MacTablet	$299
12″ x 12″ MacTablet	$399

The Macintizer is *better* than a mouse: its stylus gives you precise control for drawing, you can trace original artwork, and it won't clog or skip.

PLUS, the Macintizer plugs directly into the mouse port for 100% compatibility with all your programs—no software modifications required.

Turn your Macintosh into the graphics machine it was meant to be—with the Macintizer.

Contact your dealer or GTCO Corporation for more details.

Ask About Our Macintizer XL

GTCO Corporation
1055 First Street, Rockville, MD 20850
Phone: (301) 279-9550 Telex: 89-8471

Circle 323 on reader service card

least, but the remark, "the smart thing would have been to phase out the Apple II" is so cavalier that I must respond.

No matter how great the Macintosh is, Apple cannot afford to intentionally alienate the base it has built up in the Apple II. A company like IBM may get away with canning the PCjr, but I cannot believe Apple will be tolerated in regularly repeating such behavior. Why should users or developers bother to support an Apple III or a Lisa or a Mac if it costs them dearly to do so?

William Clarke
Missoula, Montana

Get More File Finders

In the May 1986 *Get Info,* Lon Poole wrote about desk accessories that allow file deletion. Our *FileFinder* was not mentioned, though it was featured in the April *Macworld View.* In addition to letting you delete files, *FileFinder* lets you copy, rename, and get info about files without having to quit an application.

Like the other desk accessories you mentioned, *FileFinder* version 1.1 is not compatible with the Hierarchical File System (HFS). Those interested in an HFS version may write to us, and we will notify them when this version becomes available. *FileFinder* can be ordered directly from us for $24.95: Nashoba Systems Inc., 175 Sudbury Rd., Concord, MA 01742, 800/842-4250, 617/371-2029 in Massachusetts.

Don Warren
Nashoba Systems
Concord, Massachusetts

We have also learned about a file finder that works with the HFS: PBI Software's HFS Locator, *which finds files by name or date, no matter how deeply nested in folders. Once it locates the files, the desk accessory can move, delete, launch, copy, rename, or get info about them. The program, which retails for $24.95, is available from PBI Software, 1111 Triton Dr. #201, Foster City, CA 94404, 415/349-8765.—Ed.*

Fedit Gone Astray?

Last November I sent a money order for $30 to John Mitchell to become a registered user of his *Fedit* 3.0 file editing program (mentioned in the November 1985 *Macworld* article "Recovering a Damaged Disk").

The program itself is available at no charge via CompuServe. Users are free to try the program and, if they wish, pay the fee to become registered users, who receive the instruction manual for the program and any updated versions as they are produced.

Five months later I had still not received a reply or a refund.

Brian L. Warbey
Saskatoon, Saskatchewan
Canada

John Mitchell informs us you've already been issued a refund check. Mitchell delayed sending updates while he prepared a version that would work with the HFS—thinking that it would take only another week . . . and then another. . . . The new version was nearing completion at this writing; call 408/773-9834 about availability.—Ed.

A New Angle on Shareware

In the spirit of the shareware concept, I am offering my booklet of Macintosh hints. As long as the supply lasts, in exchange for a 6- by 9-inch self-addressed envelope with 39¢ postage, I will send any *Macworld* reader a copy. The indexed booklet includes a number of the undocumented ⌘-key and Option-key combinations for the desktop, *MacPaint, MacWrite, MacDraw,* and many other programs. In turn, I encourage the recipient to send me $3 or whatever seems fair.

Ken Knecht
1340 W. Third St. #130
Yuma, Arizona 85364

Not the Model Program

Keith Thompson's review of *Mindsight* ["Beyond Spreadsheets"] in your April 1986 issue touched a sore point.

Mindsight is unusable as a financial modeling program, mainly because it has no command language (macro) capability. If you prepare a model of 500 rows and need to print 70 rows for financial statements, you have to individually choose each row and format a report every time you want to print a different case. It is surprising that your reviewer should think so highly of such a crippled package. The same publisher's MS-DOS program, *IFPS,* does have command language capability.

The Macintosh is still crying out for a financial modeling language. I hope the people at Apple are listening.

M. Alland
Potomac, Maryland

(continues)

The C for the Macintosh

"Library handling is very flexible... documentation is excellent... the shell a pleasure to work in... blows away the competition for pure compile speed... an excellent effort."

COMPUTER LANGUAGES, 4/85

Why Professionals Choose Aztec C

Professionals choose Manx Aztec C development systems because they are the most powerful, portable, and professional microcomputer C development systems available. Professionals know that Manx Aztec C offers the features, dependability, and performance required for producing professional results.

Applications implemented with Aztec C development systems range from real time control of robot arms used in manufacturing, to message switching systems, to games, languages, operating systems, and business systems.

Much of the commercial software for the Apple Macintosh including top selling titles from software publishers Broderbund, Hayden Software, and Spinnaker is developed using Manx Azec C.

Value, Performance, and Flexibility

Manx Aztec C68k for the Macintosh is available as a line of three upgradable development systems: Manx Aztec C68k-p, Manx Aztec C68-d, and Manx Aztec C68k-c. Student, noncommercial, and small business discounts are available. Whatever your budget and requirements, there is a Manx Aztec C68k development system that offers you the best value and performance for your investment.

New Macintosh Mouse Interface

The highly acclaimed, powerful, and professional Manx Aztec SHELL development environment now includes a mouse interface. Developers unfamiliar with UNIX or MS-DOS can work entirely with the mouse interface. Those interested in learning the advanced features of the SHELL can do so at their leisure. Developer's familiar with UNIX or MS-DOS can ignore the mouse, if they so choose, and work entirely in a familiar command driven environment.

Aztec C, The Most Portable C.

Manx Aztec C Development Systems are available for the Apple Macintosh, Apple*II*, IBM PC, PC compatibles, CP/M-80 systems, Radio Shack Systems, and the Commodore 64/128. Manx Aztec C is also compatible with UNIX and UNIX ports. Manx currently is developing systems for the Amiga and other microcomputer systems. No other C Development System for the Macintosh comes close to the portability of Manx Aztec C.

Power To Spare

In benchmark after benchmark, Manx Aztec C appears in column after column as the clear winner.

The following sieve benchmark timings are reprinted with permissions of Computer Languages, 131 Townsend Sr., San Francisco, Ca 94107 from a Macintosh review that appeared in the April, 1985 issue:

compiler	compile/link	run	size
Manx Aztec	49	7	13,274
Megamax	114	7	13,816
Softworks	201	9	46,914
consulair	152	10	17,654
Hippo 2	102	13	30,648

The following sieve benchmark timings are reprinted with permission of Macworld, 555 De Harro St., San Francisco, CA 94107, from the May, 1985 issue from "Mac Wins By a Length" in the Open Window column.

Language	Run Time
Aztec C 1.06C	6.55
McFORTH 2.0	20.01
Modula-II	71.60
MBASIC 2.00	1170.00
Pascal	1270.00

Sieve timings for Manx Aztec C68k 1.06g:

with register variables 3.37 secs 5,007 bytes
without register variables 6.02 secs 5,140 bytes

Manx Aztec C68k - Professional Tools

Manx Aztec C68k is bundled with a rich abundance of tools to help produce superior results in reasonable time frames. The following is a list of features and facilities included in Aztec C68k-d, the Developer's System, and Aztec C68k-c, the Commercial system. Items that are marked -c are unique Aztec C68k-c.

Optimized C	Mouse Enhanced SHELL
UNIX-like SHELL	Creates desk Accessories
Macro Assembler	Creates Clickable Applications
Smart Overlay Linker	Phone Support
C-PASCAL Interface	PASCAL-C Interface
Resource Compiler	UNIX Library Functions
Debuggers	Terminal Emulator (Source)
Object Librarian	Easy Access to Mac Toolbox
Mouse Editor	unlimited code size
IEEE floating point	six register variables
Inline assembly	extensive sample programs
600 page manual	hard disk support
no license fees	PASCAL type strings
MacinTalk support	AppleTalk support
code optimizer	symbolic debugger (512k)-c
MacRam Disk-c	UniTools (ul, make grep, diff)-c
Library Source-c	One Year Of Updates-c

Summary

If you plan to program in C on the Macintosh or are currently doing so using a brand x C compiler, there is a Manx Aztec C68k system for you that offers the best value and the greatest degree of portability, power, and professional quality available.

Look around, evaluate, and compare. The more you look, the more you compare, the more you will see that Manx Software Systems has succeeded in its objective to provide you with the best C development system available at the best possible price. Then, give us a call, and join the 25,000 users who already know and enjoy the Manx Aztec C advantage.

Products and Prices

Aztec C68k-c Commercial System	$499
Aztec C68k-d Developer's System	$299
Aztec C68k-p Personal System	$199
C-tree database (with source)	$399
Lisa Kit	$ 99
MS-DOS → Macintosh Cross	$750

Discounts

Discounts are available for professors, students, independent developers, hobbiests, and small businesses.

How To Become an Aztec C User

To become an Aztec C user call 1-800-221-0440 or call 1-800-832-9273 (800-TEC WARE). In NJ or outside the USA call 201-530-7997. Orders can be telexed to 4995812.

Payment can be by check, COD, American Express, VISA, Master Card, or Net 30 to qualified customers.

Orders can also be mailed to Manx Software Systems, Box 55, Shrewsbury NJ, 07701.

How To Get More Information

To get more information on Manx Aztec C and related products, call 1-800-221-0440 or 201-530-7997, or write to Manx Software Systems.

30 Day Return Policy

Manx has a 30 day return policy. If you don't like your Manx Aztec C development system, return it within thirty days for a refund. Refunds do not include shipping costs, and might incur a small restocking charge.

Distribution Of Manx Aztec C:

In the USA, Manx Software Systems is the sole and exclusive distributor of Aztec C. Any telephone or mail order sales other than through Manx are unauthorized. Aztec C is available from qualified retail outlets under license to Manx Software Systems.

Circle 112 on reader service card

MANX

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dMac III... Macintosh and database. An exciting match.

Dealers circle 535 on reader service card
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Reinventing the Typo

You're right. In many ways, *MacSpell+* [*Macware Reviews,* March 1986, and "Letter-Perfect Documents," July 1986] is a slick product—but with a serious problem: its dictionary contains misspelled words.

Back in the dim days of prehistory when I spent several hours per day with my Osborne 1, I used a spelling checker that contained all sorts of useful utilities, including the ability to remove words from the dictionary.

In this business, the wheel really is reinvented from time to time, and sometimes new versions are flat on one side.

Gary Johnson
White Bear Lake, Minnesota

Burned Up over Parts Policy

The flyback transformer burned out on my Mac's video controller board. When I took it to a dealer, I was given the option of purchasing a new board at $515 or doing a board swap for $195. I could not purchase just the new transformer because Apple sells those only to dealers. Again the little guy takes it in the shorts. I don't sell computers, I just happen to own one.

Jerry Stidham
APO Miami, Florida

Technically competent users find the policy exasperating, but it's typical throughout the personal computer industry that manufacturers discourage users from tinkering with the power supply, as a safety precaution. Though you may dispute the widsom of absolutely restricting the distribution of parts—not even authorized service centers can obtain some parts individually—it does guarantee a standard quality of repair and prevent the intrepid but untrained from suffering injury or expensive fixes.—Ed.

Correction

An outdated telephone number was published for DPEX, maker of the Mac/2392 terminal emulator, in "Mini and Mainframe Connections," *Macworld,* July 1986. The current number is 408/734-5932.

Also, the correct number for Mesa Graphics, producer of the Tekalike terminal emulator, is 505/672-1998.

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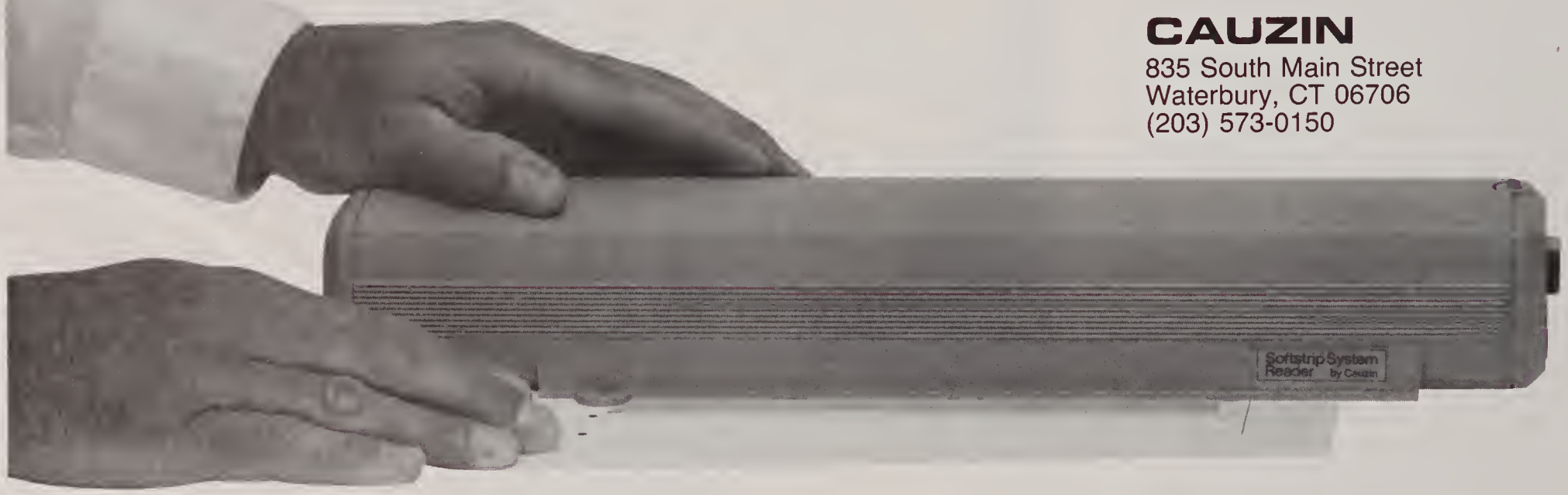

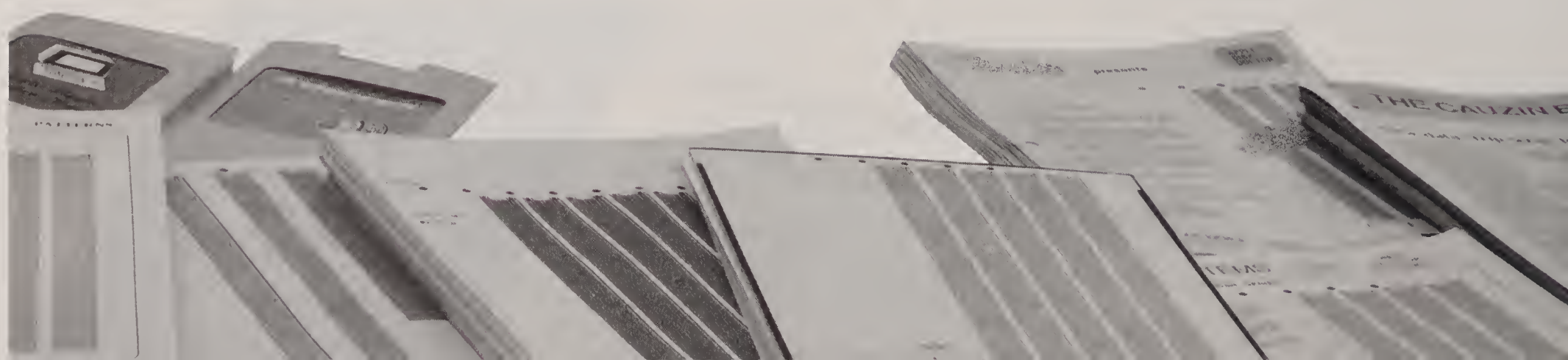

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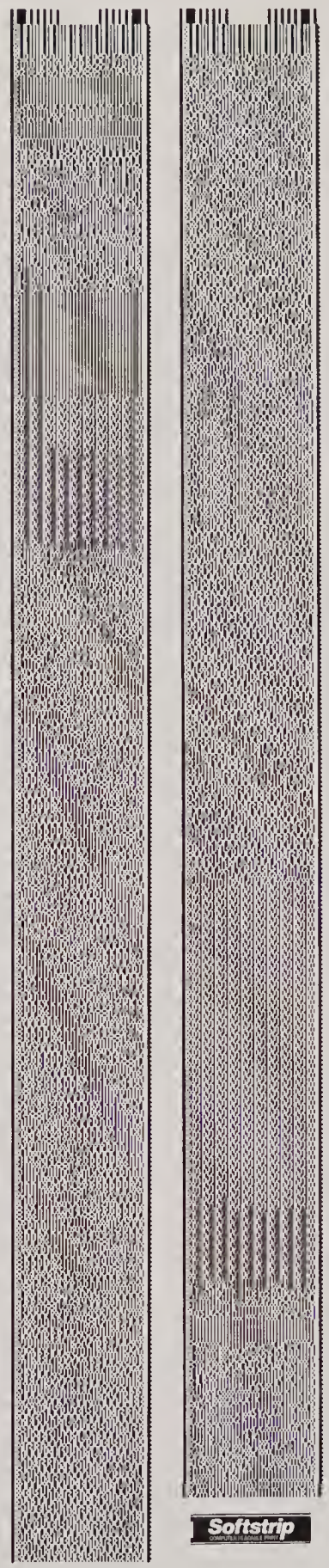

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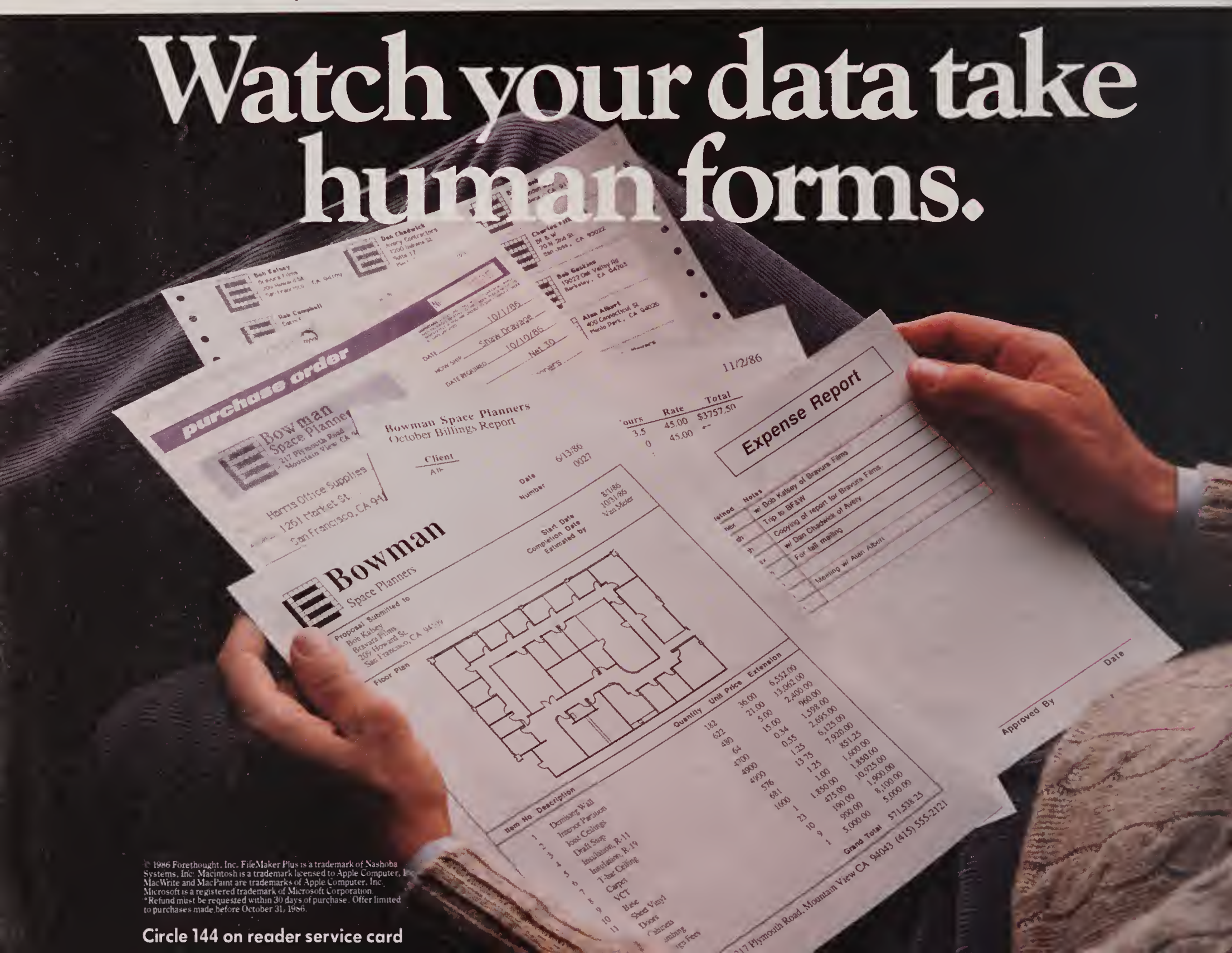

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Macworld View

An alternative to AppleTalk, SCSI tape drives, desktop publishing, large-screen Macs, and more

Edited by Daniel Farber

Big-Screen Mac

If you want a large black-and-white screen for applications like desktop publishing, computer-aided design, or education, a few options are available. One is to install a composite video display adapter from the Macintosh to a high-resolution monitor. This converts the 22.5-kHz scan rate of the Mac to the standard TV scan rates. Mentauris Corporation (1658 IH 35 South, San Marcos, TX 78666, 512/396-1565), for example, sells a $199.95 adapter that is compatible with a wide variety of monitors—costing from $1000 to $3000—and more expensive projection devices.

MacVideo Processor (MVP) from MultiVideo (4 Johnston Way, Scotts Valley, CA 95066, 408/438-3663) takes a different approach. It displays the Mac screen on standard TVs, projection TVs, and VCRs. An image processor attaches to the back of the Macintosh with an interface board that clips onto the motherboard. You can zoom up to 16 times normal display and pan to view other sections of a magnified image. You can also freeze an image on the TV screen and continue to work on the Mac without affecting the TV image. The interlace design of TV screens results in some flickering, especially in images that contain lots of horizontal lines. Projection TVs eliminate most of the flicker, however. MVP has its own power supply and sells for $995.

MegaScreen, from Micrographic Images (20954 Osborne St., Canoga Park, CA 91304, 818/407-0571) takes the big-screen concept one step further. The Mac screen appears on a 19½-inch, high-resolution monitor (the same one used for Sun workstations) at 1024- by 921-pixel resolution. In effect, MegaScreen displays four to six times the surface area of the standard Macintosh screen. The hardware includes a proprietary graphics control-

(continues)

MEL LINDSTROM

The MacVideo Processor, which is installed on the back of the Macintosh, displays enlarged Mac images on standard TV screens.

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DAVID STRICK

Micrographic Images' Janek Kaliczak demonstrates the MegaScreen's ability to display a full-page PageMaker *image at high resolution.*

Big-Screen Mac (continued)

ler, a power supply, and an interface to the motherboard. MegaScreen has outputs for both TTL and NTSC composite video. Programs like *MacDraw, PageMaker, ReadySetGo, Professional CAD for the Mac, McCAD,* and *Quik Circuit* take advantage of the full screen and resolution without any problems. The monitor costs $1595, and MegaScreen sells for $1495.

dMac III

With Ashton-Tate's *dBase* the most popular database for personal computers, it's surprising that no one has developed a *dBase* for the Mac—until recently, that is. Format Software of San Diego now publishes a programmable database that is compatible with *dBase II, III,* and *III+*. The program transfers data between the Mac and PC-DOS-based versions without modification. *dMac III* doesn't use the full Macintosh interface, mainly because the program's first objective is compatibility with *dBase*.

(Ashton-Tate has yet to release its database product for the Macintosh, but we expect it to follow the Macintosh user interface to the letter and to be compatible with *dBase* files.)

Tom Haag, president of Format Software, has aimed the $495 product at developers of *dBase III* programs. "This gives them the flexibility to create turnkey systems for people who want to use the Mac," he says. "*dBase III* programs already existing can easily be ported to the Mac." The company plans to develop a more Mac-like version of *dMac III* in the future. For more information, contact Format Software, 11770 Bernardo Plaza Ct. #208, San Diego, CA 92128, 619/487-6946.

SCSI Tape Drives

As a kid you probably tried hanging on to a merry-go-round while your friends pushed it faster and faster until you either flew off or threw up. That's what life is like for information stored on a hard disk. The edge of a typical 3½-inch hard disk travels faster than 70 miles per hour; a 5¼-inch disk goes over 110 miles per hour. At those speeds, it's a miracle that information remains intact. When massive quantities of expensive programs and priceless documents go into orbit, you want to be prepared with a reliable copy of your hard disk's contents.

Sure, you can back up a hard disk on 25 or more double-sided disks, provided you have several hours and a strong wrist. If your budget exceeds your stamina, a tape drive may be the answer. Tape drives range in capacity from 20 to 60 megabytes per tape cartridge and store information at rates of up to 5 megabytes per minute.

Although most people think of tape drives as backup devices, they have other valuable uses. Imagine shipping or carrying 10 or 20 megabytes across the country, locking away sensitive information in a safe, or increasing the virtual capacity of your hard disk drive.

The advantages of tape drives are not lost on manufacturers of SCSI equipment for the Macintosh. Even Apple is widely rumored to be working on a SCSI tape drive, something Apple mass-storage product manager Al Zisser refuses to confirm or deny. At least one manufacturer is waiting to see what Apple decides to do. "We want people who use our tape drives to be able to exchange tapes with people who use Apple's," says SuperMac Technology's president Steven Edelman.

However, the half-dozen developers who have already announced tape drives don't appear to be worrying about Apple setting a de facto standard.

Mirror Technology offers the Magnum Tape 20, which has a 20-megabyte capacity and a $1095 list price. Another model, the $2495 MagNet Tandem 40, puts a 20-megabyte hard disk and a 40-megabyte tape drive in one cabinet. LoDown's two tape drives, the T-20 and the T-60, have capacities of 20 and 60 megabytes, respectively. The T-20 lists for $895, the T-60 for $1795.

The Sun Safe-60 from Sunol Systems stores up to 60 megabytes on each tape cartridge you feed it. List price of the tape drive is $2195. Micah offers a 40-megabyte tape drive that retails for $1495.

AST has two SCSI product lines that include tape drives. The AST 2000 base unit contains a 20-megabyte disk drive and a 20-megabyte tape drive; it lists for $2795. The AST 2000 with the tape drive alone costs $1695. The higher-capacity AST 4000, with a retail price of $6995, has a 60-megabyte tape drive and a 74-megabyte disk drive.

Peripheral Land offers the MacBack20 and the MacBack60, 20-megabyte and 60-megabyte tape drives that work only with Peripheral's MacFast line of SCSI disk drives. An intelligent link between tape drive and

(continues)

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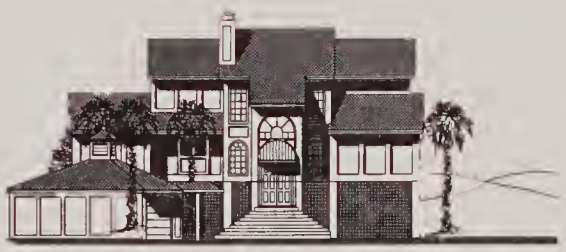

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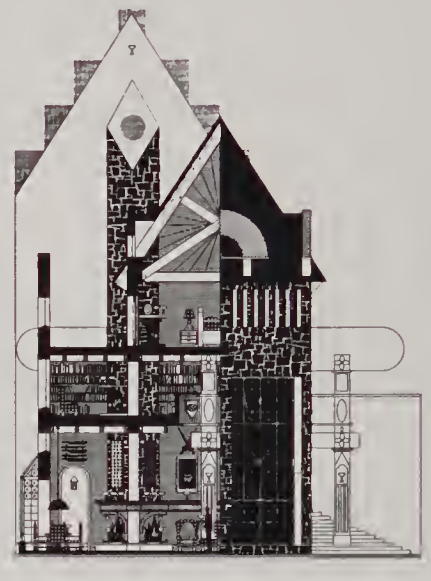

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SCSI Tape Drives (continued)

disk drive means that once information transfer has begun, the Mac's attention is no longer required. List price is $1249 for the MacBack20 and $1995 for the MacBack60.

Software supplied with the tape drives varies widely, and all of it is evolving rapidly. Minimal software simply dumps an entire disk or volume onto tape. Other programs let you pick folders and files to save to, or retrieve from, tape and can save and reuse lists of files and folders. Still more sophisticated software provides for automatic incremental backup: you insert a tape and click a button, and the software backs up all the files that have changed since the last backup. The best packages combine all these features, plus letting you add and remove files and folders before beginning the incremental backup. Most manufacturers provide free software updates to registered owners.

Is there a tape drive in your future? If you need removable mass storage for any reason—hard disk backup, increase storage capacity, information security, or portability—the answer may be yes.—*Lon Poole*

PhoneNet

Farallon Computing has introduced an alternative to Apple's AppleTalk hardware. PhoneNet is a system of AppleTalk-compatible network hardware that operates over ordinary phone lines. Installing the system with existing phone lines and standard modular phone extension cables reduces wiring costs from about $1.50 per foot with Apple's cables to 10 cents per foot, says Reese Jones, a spokesperson for the company. "PhoneNet requires only two wires between machines, whereas AppleTalk uses three. The advantage of this stems from the fact that the phone company often installs only four conductor cables in a building. The telephone uses two of the lines, still leaving two for PhoneNet," Jones explains.

Originally developed by members of the Berkeley Macintosh Users Group at the University of California, PhoneNet uses a low-resistance floating ground circuit, which allows much longer cable lengths (3000 feet or more with a repeater, compared to AppleTalk's 1000). The system is compatible with single-line phones and Private Branch Exchange (PBX) systems, and hardware such as IBM PC/AppleTalk boards and the Kinetics Ethernet Bridge. You can add or remove devices without disturbing the network, and you can daisy chain devices. The PhoneNet works in combination with Apple's cables and connector box.

"PhoneNet is a pragmatic approach to networks," says Jones. "Wiring up a network in a large corporation or university costs from $1000 to $3000 per room. PhoneNet is a less expensive way to accomplish the same thing."

The cost for the PhoneNet connector is $49. Versions are available for both the 512K Mac and the Macintosh Plus. For more information, contact Farallon Computing, 1442A Walnut St. #64, Berkeley, CA 94709, 415/849-2331.

NextWrite

Steve Jobs may no longer carry the official flag for the Macintosh, but his new company, Next, has developed a new word processor for the Mac. The program takes over where *MacWrite* leaves off. "While useful for creating short, simple documents, the program also has features that are invaluable for generating complex documents such as manuals and dissertations," says Dan'l Lewin, vice president of marketing at Next.

The program performs operations such as scrolling, reformatting, and repagination faster than *MacWrite* or *Microsoft Word*. It displays multiple columns of text on screen, as well as automatically numbered footnotes, headers, and footers. Documents are limited only by memory, and you can open as many at once as memory allows. A built-in 50,000-word spelling checker and a utility that translates *MacWrite* and *Word* files to its document format are also included. At press time, Next, whose main focus is on developing scholars' workstations for higher education, had not finalized marketing plans for the product.

LEE YOUNGBLOOD

Dr. Brown with his consulting tool: face meets interface?

Plastic Surgery Mac

With mouse in hand, Donald Brown, M.D., trims and reshapes the nose and chin of a face on the Macintosh screen. He then zooms into FatBits to sculpt a more distinct chin and refine the tip of the nose. With a few clicks of the mouse, he finishes the reconstruction, and the patient looks with satisfaction at Dr. Brown's artistry.

Brown, a San Francisco plastic surgeon, believes he has found the perfect device for improving doctor-patient communications. He scans preoperative photos of patients into the Macintosh via ThunderScan and then edits the photos in *MacPaint*. "The Mac serves as a blackboard for the physician and the patient. It is a great way of defining patient expectations, and it brings a closer understanding of what we will try to achieve through the surgery," says Brown. Before the Macintosh, Brown and most other plastic surgeons re-

(continues)

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Plastic Surgery Mac (continued)

lied on pencil and paper, tracing over photos on onionskin paper, and a lot of talk.

While the Mac is best suited for designing facial modifications, such as nose and chin alterations, Brown says it can give patients visual feedback about the potential results of facelifts, breast reductions and augmentations, and fatty-tissue removal.

He now has three Macintosh Pluses networked in his office—one at the front desk for scheduling and maintaining patient records, another for accounting, and one in his own office for patient consultations. Brown's new technique has increased patient satisfaction, and consulting takes less time.
—Elinor Craig

512K SCSI Adapters

If you have a standard 512K Mac or a third-party megabyte Mac, and you don't want to invest $599 or $799 to get Apple's SCSI (and memory) upgrade, Peripheral Land's MacPort SCSI Host Adapter and SuperMac Technology's DataPort offer reasonable alternatives and cost savings. Even if you have a Macintosh 512K Enhanced, you can buy a third-party memory upgrade and one of these SCSI adapters, shaving about $200 off Apple's upgrade price.

Both MacPort and DataPort connect to the Mac's ROM socket and provide a connector for external devices—through the battery panel—as well as for software. Dealers perform the upgrade, but you can do it yourself if you are mechanically inclined. Neither SCSI adapter works with the HyperDrive, since both connect to the bus. Both MacPort and DataPort let you start up without floppy disks if you have the 128K ROM.

MacPort, which costs $99, works with any SCSI device that uses the Omti controller (SuperMac, LoDown, Mirror Technologies). Peripheral Land provides a 90-day warranty for MacPort.

The DataPort Apple SCSI driver is 100 percent compatible with Apple's SCSI controller, according to SuperMac Technology. The cost of $99 with SuperMac Technology's DataFrame SCSI hard disk, and $299 without it, includes a one-year warranty.

For more information, contact Peripheral Land, 3677 Enochs St., Santa Clara, CA 95051 or SuperMac Technology, 1901 Old Middlefield Way, Mountain View, CA 94040.

MARK HANAUER

Putting AI on the Mac: ExperTelligence president Denison Bollay—with office mascot Oliver.

ExperTelligence

Denison Bollay, president of ExperTelligence, admits his ideas are ahead of their time. In 1980 he started the craze over computer camps—a concept that is still alive today. Bollay's real interest is now in artificial intelligence (AI), which he has been involved in since the mid-seventies—not as an esoteric science but as it applies to everyday life.

Since the coming of the personal computer, Bollay has dreamed of bringing AI applications like expert systems to PC users. But not until the advent of the Macintosh was he able to turn his concepts into reality.

Since there was no way to develop expert system tools rapidly without using LISP, the most popular AI programming language, Bollay created a version of LISP for the Macintosh—ExperLisp. Today ExperTelligence, the publisher of ExperLisp, has the largest installed base of compiled LISP users. Not large when compared to the number of developers using C or Pascal, but Bollay and his co-workers believe that the LISP revolution is just beginning.

"Application programs have reached a threshold. To create more powerful, sophisticated ones, you must add a layer of intelligence or expertise. You can do so with Pascal or C, but LISP is specially designed for that task and is 10 to 20 times faster. There is a tremendous

(continues)

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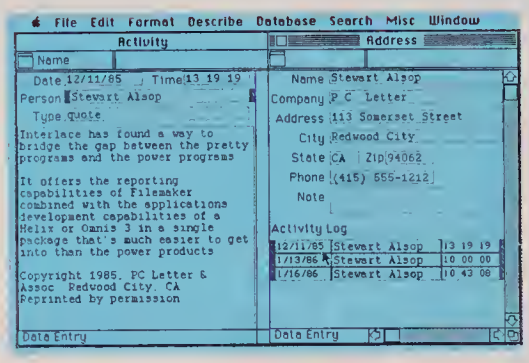

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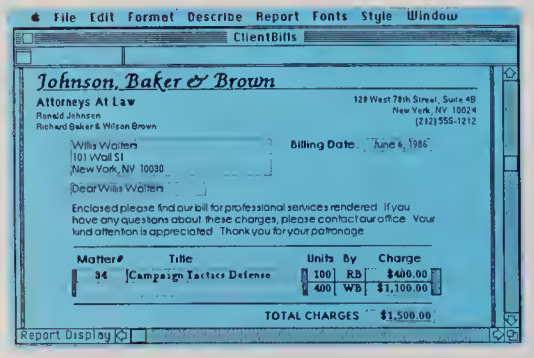
May, 1986



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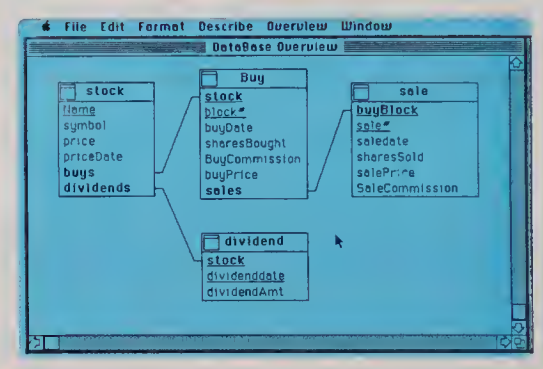

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ExperTelligence (continued)

potential for developing expert systems for the Mac or integrating them within a spreadsheet or database," says Bollay.

Bollay has also taken a step toward creating a symbiotic relationship between personal computers and dedicated AI development machines such as the Symbolics 3600. Recently, ExperTelligence entered into a comarketing agreement with Symbolics, the leading manufacturer of symbolic processing systems, and developed *ExperLink,* which allows text files to transfer between a Symbolics LISP Machine and the Macintosh running ExperLisp. Expressions can be evaluated on the more powerful Symbolics machine and the results returned to the Macintosh.

According to Bollay, serious AI users who are accustomed to $100,000 LISP machines will find that they can do at least 75 percent of their work on a Mac Plus and then use *ExperLink* to transfer data to the Symbolics machine.

In addition, ExperMultiOPS5, an expert system development tool, lets you create programs that run on both the Symbolics machine and the Macintosh. You can send data from remote locations to the Macintosh and incorporate that data into expert systems running on the Symbolics machine.

Bollay hopes to break the knowledge engineering barrier in a few years so that an expert's knowledge can more easily be distilled into a set of rules, and is looking into creating expert system links to CD ROM databases. For the near future, however, he plans to finish version 2.0 of ExperLisp—with a Smalltalk-like class system—to provide expert system tools to harness the intellectual powers of Mac users.

MacCalc

Multiplan and *Excel* have garnered the majority of the spreadsheet market, but that didn't stop Bravo Technologies from introducing its own number-crunching program, *MacCalc.* The program lacks many of *Excel*'s powerful features, such as graphics, spreadsheet linking, and database and macro capabilities, but *MacCalc* is designed primarily for economy and speed: the $99.95 product recalculates as fast as *Excel,* and cut and paste operations are even faster. The program also allows you to combine multiple fonts and styles within one spreadsheet and includes an annotation feature for appending notes to a cell. For more information contact Bravo Technologies, P.O. Box T, Gilroy, CA 95021-2249, 415/841-8552.

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Macworld Best-Seller Software

This month	Business	Last month	Months on chart
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2	Microsoft Word, *Microsoft*	2	14
3	PageMaker, *Aldus*	4	2
4	MacDraw, *Apple Computer*	3	11
5	Microsoft Multiplan, *Microsoft*	9	14
6	Microsoft File, *Microsoft*	7	13
7	Sidekick, *Borland*	–	0
8	Dollars and Sense, *Monogram*	14	14
9	ThinkTank, *Living Videotext*	–	5
10	MacDraft, *Innovative Data Design*	–	0
11	Jazz, *Lotus Development*	5	10
12	Microsoft Chart, *Microsoft*	–	13
13	MacProject, *Apple Computer*	6	11
14	Back to Basics, *Peachtree*	14	4
15	OverVue, *ProVue Development*	–	2

Source: InfoCorp survey of over 200 retail stores

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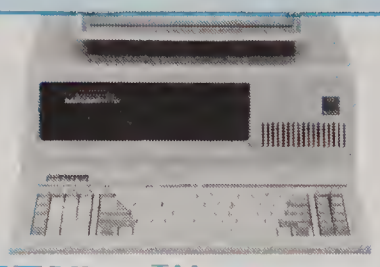

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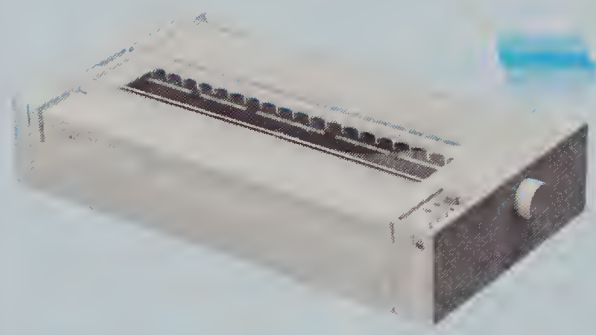

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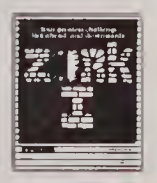

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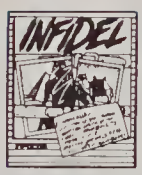

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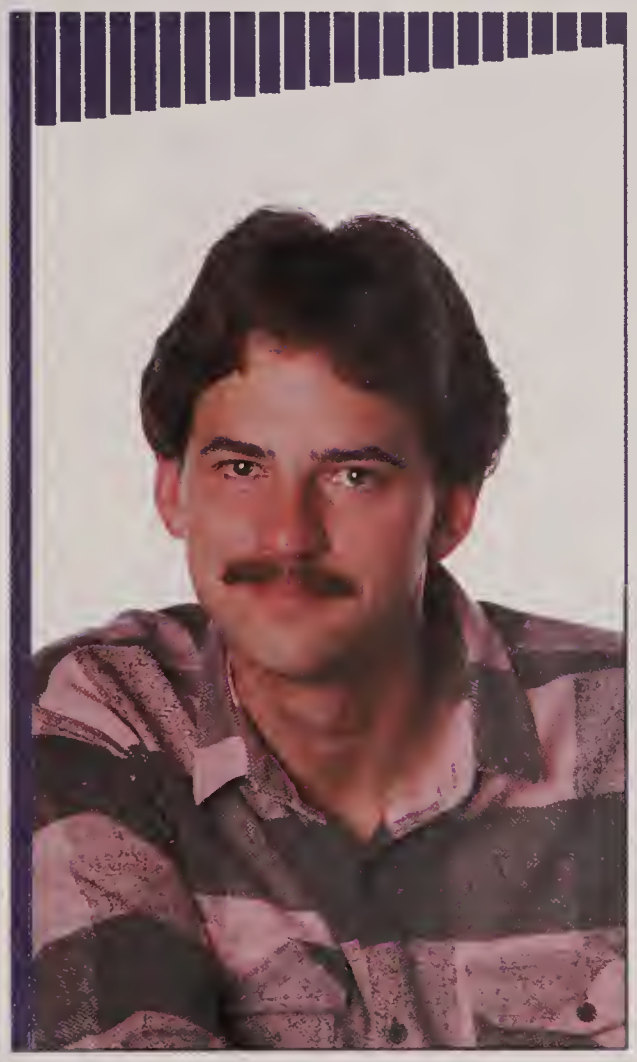
Get Info

A hand decoder for system error messages, a technique for customizing date formats, and more

Lon Poole



Even when the Finder reports 0 items, the Desktop file takes up space on your disk.

If you've wondered why the vital statistics of a newly initialized disk don't add up, read on for an explanation. Also this month: how to change the startup application, modify date formats, and make room in a BASIC program for user input. Plus a report of flaws in MacDraw's *font handling and an interpretation of system error codes.*

Missing Disk Space

Q. Initializing a new double-sided disk consumes between 11K and 21K of disk space. For example, the disk's title bar may indicate that there are 0 items on the disk, 11K on disk, and 789K available. This didn't happen on 400K disks. Can you shed any light on the mysterious disappearance of the disk space?

Chris Hagberg
Seal Beach, California

A. Although the Finder reports 0 items, one file always takes up space on a freshly initialized or erased disk—an invisible file named Desktop that contains information the Finder uses. This information includes the Get Info comments, copies of icon images for most applications and documents on the disk, the whereabouts of applications on HFS (Hierarchical File System) disks, and folder contents on non-HFS disks.

I'll bet if you look closely at the space used and available as reported by the Finder for a newly initialized or erased double-sided (800K) disk, you'll discover that the two numbers don't add up to 800K. You'll probably find 14K or 15K unaccounted for. The Mac file system uses this space for a disk directory, an allocation map, and the "boot blocks" that contain information used at startup.

Versions 5.0 and later of the Finder likewise fail to account for all 400K on a single-sided disk, although the discrepancy is only 9K or 10K owing to a smaller disk directory. By means of a semantic trick, Finder versions 4.1 and earlier usually make space used and available add up to 400K. Finder 4.1 defines 1K as 1000 bytes, or characters, while Finder 5.0 and later defines 1K as 1024 bytes. The true capacity of a single-sided disk is 409,600 bytes. According to Finder 4.1, that's 410K, but subtracting 10K for the disk directory and so on reduces the capacity to 400K.

Undo Startup Application

Q. Several software packages have a startup routine that automatically starts a specific application. If I want to use other applications on the same disk, I have to wait for the automatic start and then quit. How can I modify the startup routine?

S. Sable
Chino Hills, California

A. The Set Startup command in the Finder's Special menu determines which application on a particular disk runs automatically when you start up the Mac with that disk. If you want the Mac to start up at the Finder's desktop, make the Finder the startup application by selecting the Finder icon (it's usually in the System Folder) and choosing the Set Startup command.

(continues)

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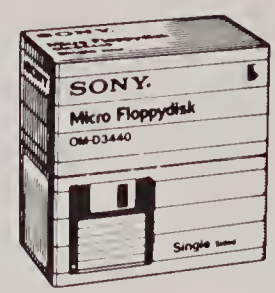

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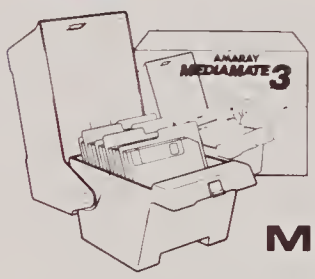

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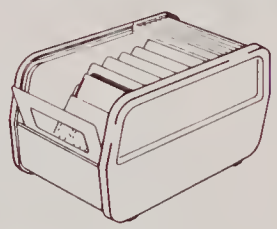

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Change Standard Date Format

Q. How can I change the System file, using a resource editor such as *ResEdit*, to change the system date format from MM/DD/YY to DD-MM-YY?

Israel J. Lawrence
FPO San Francisco, California

A. The all-numeric date format you mention is called the short date format and is part of an international resource in the System file, namely the INTL resource whose ID number is 0. You can change the order of the day, month, and year; the character that separates the different parts of the date; whether to show leading zeros for one-digit day and month numbers; and whether to show the century in four figures or two. Use Apple's *ResEdit* program (available from user groups) as follows:

- Copy your system disk; experiment on the copy, never on the original.
- Start *ResEdit* and insert a copy of the system disk. A small window appears for each inserted disk. Each window lists the applications and documents on the disk; for double-sided disks and other disks that use the Hierarchical File System (HFS), the window also lists folders. Double-click a folder's name if you want to see its contents.
- Find the System file (it may be in a folder on an HFS disk) and double-click it. Another small window opens, listing all the resources in the System file by their four-letter code names.
- Find the resource named INTL in the System window and double-click it. A window appears, listing the international resources by ID number.
- Double-click INTL resource 0. Labeled boxes in the window that opens allow you to change the formats for currency, short date, and time, as well as determine whether to use the metric system or not and specify a version number (see "Dates in Short Order").
- To reorder the date to day, month, and then year, change the box labeled dateOrder to 1 (for DD-MM-YY). In this box, 0 stands for the order MM-DD-YY and 2 for YY-MM-DD.
- Change the character that separates the different parts of the date in the dateSep box. In your case, put a hyphen in this box.

(continues)

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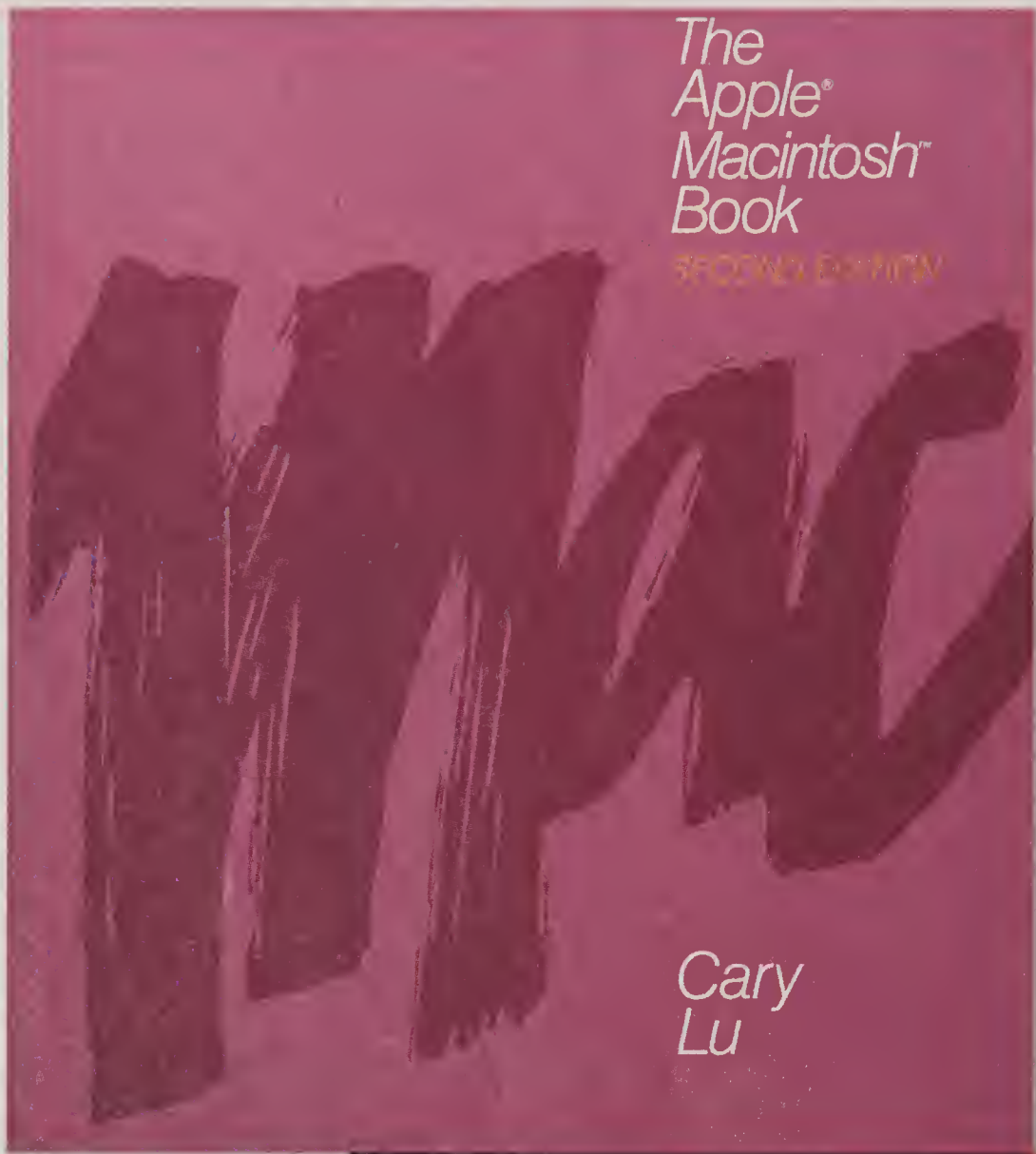

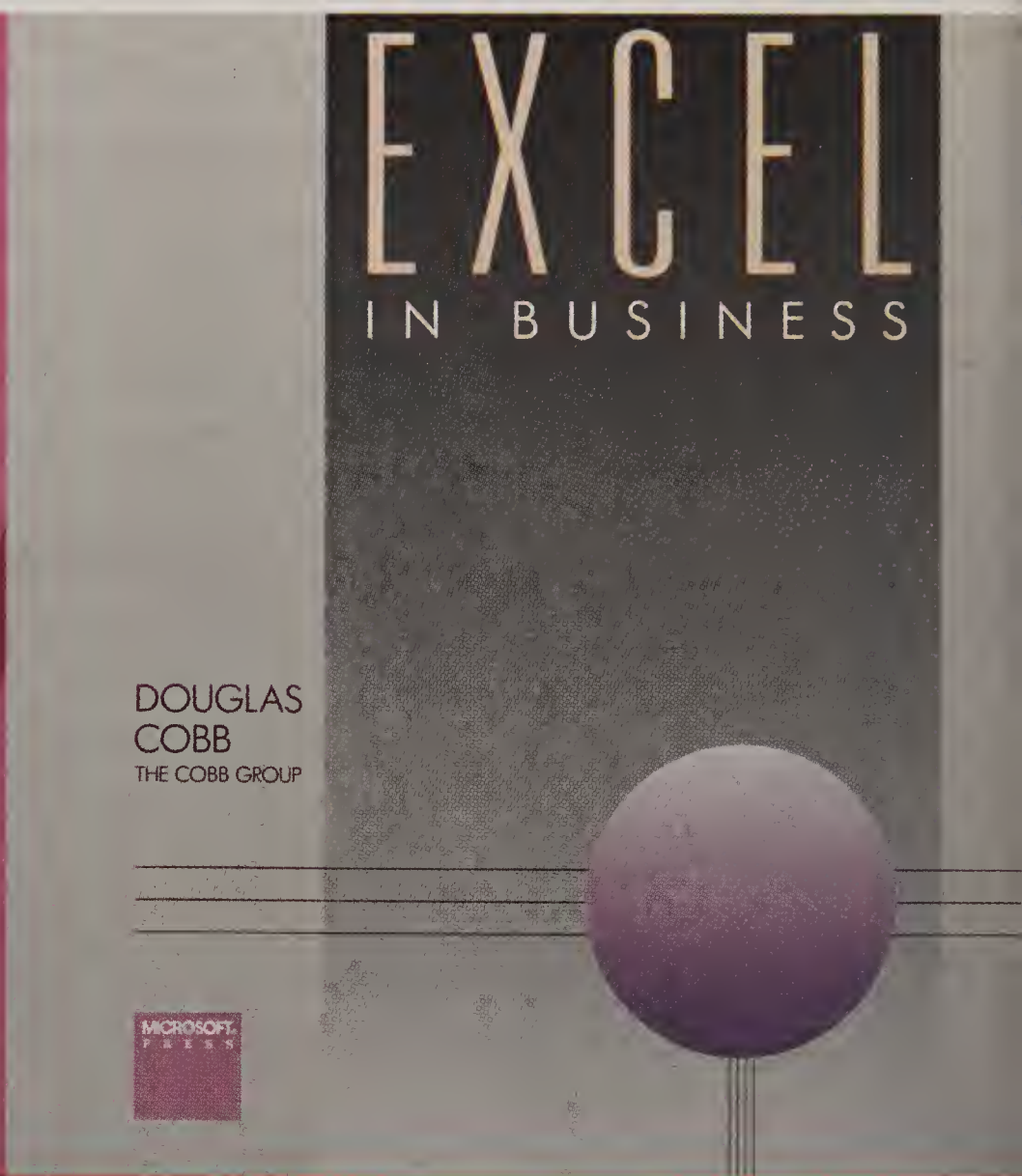

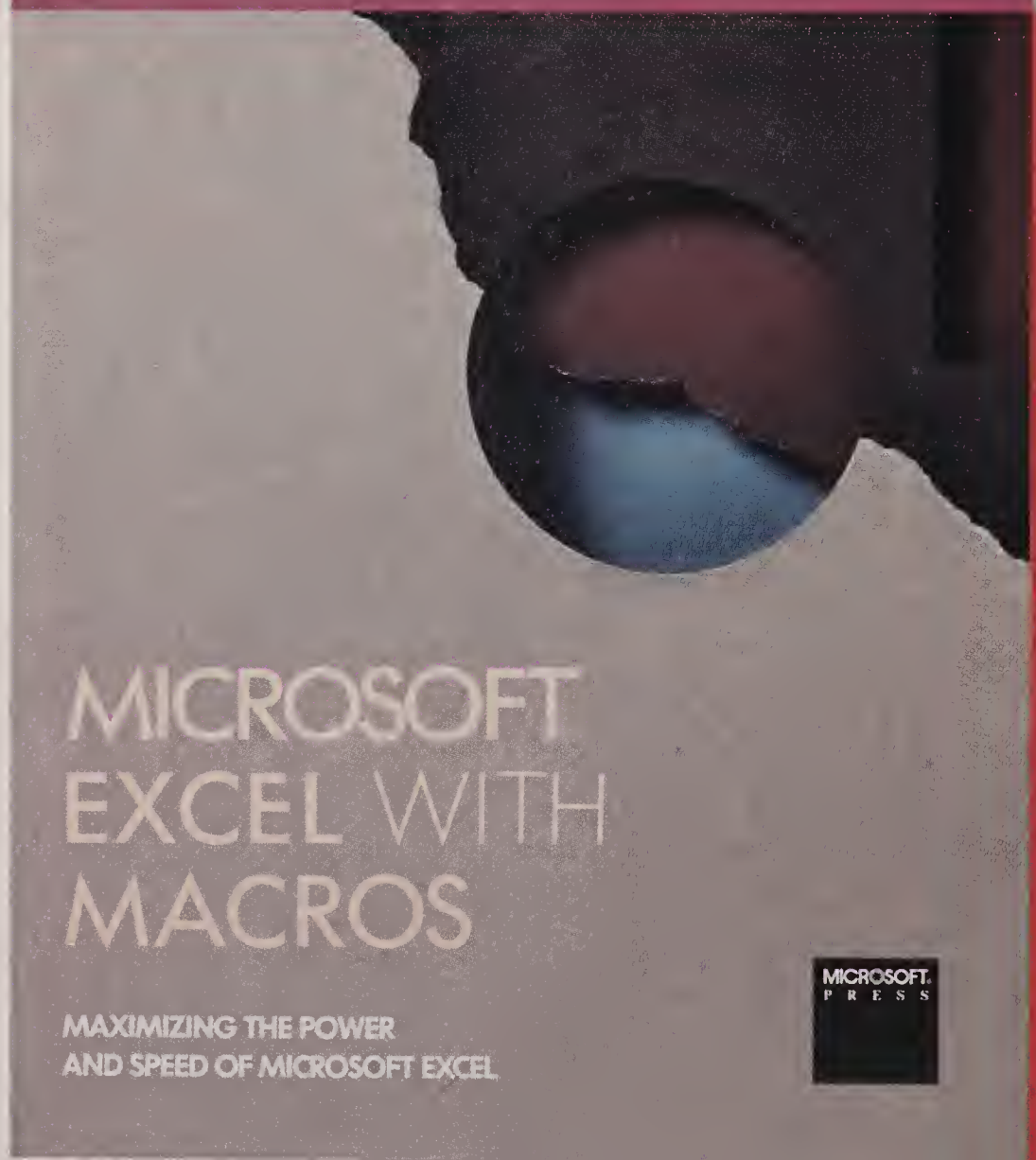

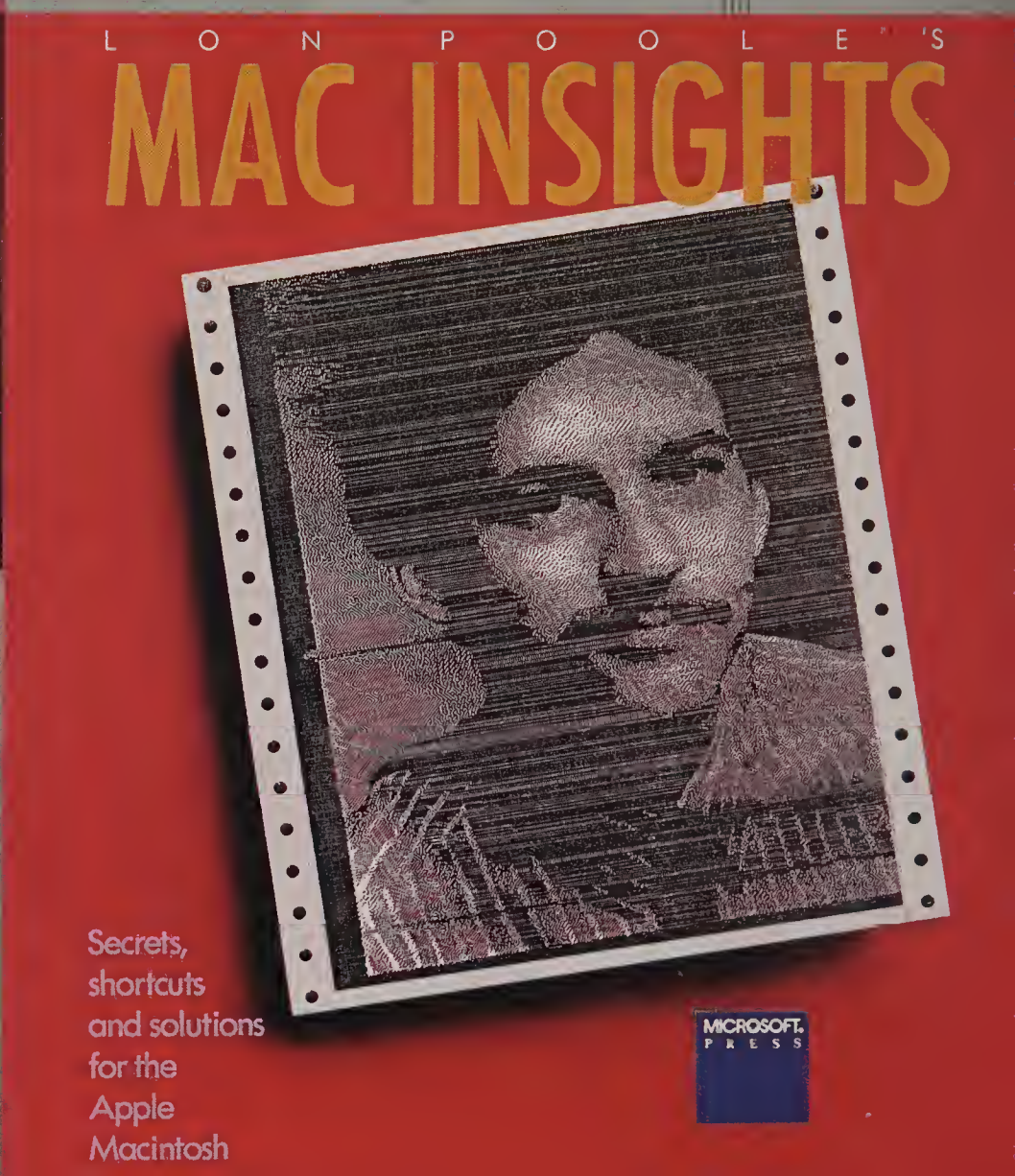

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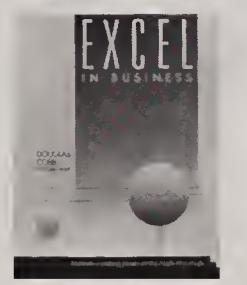

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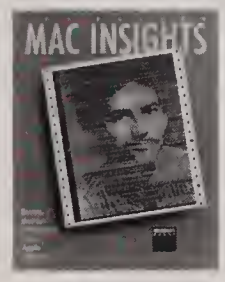

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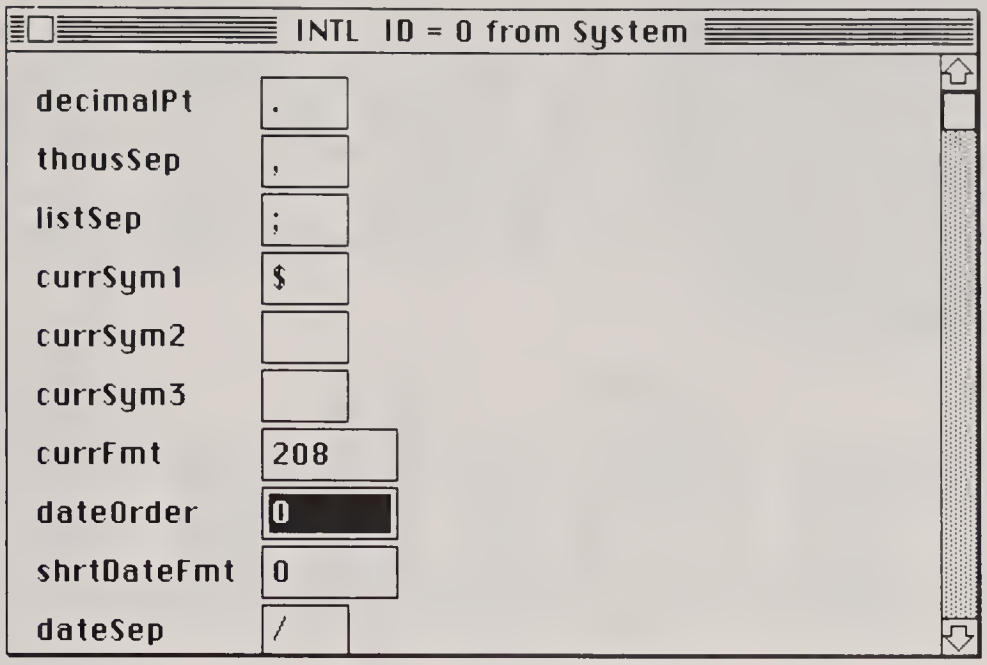

Dates in Short Order
Using ResEdit *to change the order of month, day, and year in dates, you open a series of windows, select the dateOrder box, and type a code for the preferred order.*

• The shrtDateFmt box specifies whether to show leading zeros and whether to show the full four-digit century. To do without all of those extra characters, put a 0 in this box. For leading zeros on days below 10, add 32 to the value in the box; for leading zeros on months, add 64; and for centuries, add 128. For example, to show centuries and leading zeros in both day and month numbers, enter 224 (32 + 64 + 128).

• When you finish making changes, close all the windows, answering Yes when *ResEdit* asks whether you want to save your changes, and then quit *ResEdit*.

In addition to the short date format, there's a long date format in INTL resource 1, which—in its longest form—spells out the month and the day of the week. The resource specifies the spelling or abbreviation of the month and day names, along with the punctuation and other options you can set in the short date format. Unfortunately, the latest version of *ResEdit* available at this writing, version 1.0D7, does not include an editing window for INTL resource 1. Apple's *Redit* program (available from user groups) does, but the program doesn't work with HFS disks.

Making Room for BASIC Input

Q. I am writing a program in Microsoft BASIC version 2.0 that requires the user to input long sentences. However, the cursor doesn't wrap around to a new line, and even adjusting the width of the window does not prevent the characters from disappearing off the right edge of the screen. Is there any way to change the width of the screen for input?

Tommy Beller
De Land, Florida

A. Use EDIT FIELD statements to define editable text fields within a window. These fields work just like editable text fields in other Mac applications, such as the comments field in the Finder's Get Info dialog box. Each EDIT FIELD statement specifies the following:

• A field ID number
• The suggested text to be edited or a blank area for entering text
• The size of the field
• Whether the field has a border
• Whether word wrap is on and Returns are not allowed as part of the entry, or word wrap is off and the user must press Return to end a line
• The format of the text—flush left, centered, or flush right.

After defining the window and edit fields, use the DIALOG function to monitor what the user does with the mouse and the keyboard. Specifically, when DIALOG(0) equals 2, the user has clicked an edit field, and DIALOG(2) identifies which one. Use an EDIT FIELD statement with just a field ID to activate the selected edit field.

When the user finishes editing the fields in the window and so signifies by

(continues)

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clicking the OK button you have thoughtfully provided, the EDIT$ function retrieves the current contents of the edit fields.

The simple program in Listing 1 illustrates these concepts. For specific information on the full range of parameter values for the EDIT FIELD statement and the DIALOG and EDIT$ functions, see the Microsoft BASIC manual.

MacDraw Font Follies

Q. The System file on my HyperDrive hard disk has lots of fonts, but *MacDraw*'s Font menu lists only nine of them. I tried a public domain program called *Scroll 'em,* which implements scrolling menus on non-Plus Macs, but it doesn't work right with *MacDraw.*

(continues)

```
true=NOT(false)
quit=false
WINDOW 2,,(125,110)-(400,215),-2     'Display window
CALL TEXTFONT(Chicago)
CALL MOVETO(5,21):PRINT "Title:"     'Display 3 edit field labels
CALL MOVETO(3,86):PRINT "Tape:"
CALL MOVETO(80,86):PRINT "Counter:"
EDIT FIELD 2, "",(40,75)-(70,90),1   'Display and activate 3 edit fields
EDIT FIELD 3,"",(140,75)-(190,90),1,3'(this one is right justified)
EDIT FIELD 1,"",(40,10)-(260,60),1   '1st one last so it's 1st for entry
BUTTON 1,1,"OK",(210,72)-(265,96)    'Display OK button
fieldNo=1                            'field 1 is 1st for entry

WHILE NOT(quit)                      'Don't quit until OK clicked
    dialogEvent=0
    WHILE dialogEvent=0              'Wait for user to do something
        dialogEvent=DIALOG(0)
    WEND
    ON dialogEvent
        GOSUB ButtonClick, EditMove, NoOp, NoOp, NoOp, ReturnKey, TabKey
WEND

WINDOW CLOSE 2
END

ButtonClick:                         'User clicked the OK button
    title$=EDIT$(1)                  'Get edit field entries
    tapeID$=EDIT$(2)
    tapeCount=VAL(EDIT$(3))
    GOSUB SaveRecord
    quit=true                        'And then quit
    RETURN

EditMove:                            'User clicked an edit field
    fieldNo=DIALOG(2)                'Find out which field
    EDIT FIELD fieldNo               'And activate it for entry
    RETURN

NoOp:                                'Do nothing for some dialog events
    RETURN

ReturnKey:                           'Pressing Return same as clicking OK
    GOSUB ButtonClick
    RETURN

SaveRecord:                          'Saving entries to disk not
implemented here
    RETURN

TabKey:                              'User pressed the Tab key
    fieldNo=(fieldNo MOD 3)+1        'Advance to next edit field
    EDIT FIELD fieldNo               'And activate it for entry
    RETURN
```

Listing 1
This short program demonstrates a technique for creating editable fields for user input in Microsoft BASIC programs.

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Land 478-7709. **CO:** Boulder: Friendly Computers 530-5115; Denver: CW Electronics 832-1111; Computerland 759-4685; Lakewood: Neighborhood Computer 988-9140; Longmont: Micro Computer World 651-1177. **CT:** Fairfield: Computerworks 335-6316; Microage 335-3694; Hamden: Computer Factory 281-4119; New London: Computer Lab 447-1079; Norwalk: Microage Computer 347-8428; Simsbury: Logical Systems 651-0241; Stamford: Computer Factory 356-1920; Stratford: Programs Plus 278-3662; Wallingford: Computerease 269-4440; Westport: Computer Factory 255-2822, Wethersfield: Computer Resources. **FL:** Fort Meyers: Microworks 936-4676; Jacksonville: Komputer Kingdom 641-9042; Miami: Integrated Computer 887-4777; Kendal 274-6312. **GA:** Augusta: Cash Register Exchange 724-1747; Gainsville: Preferred Sys. 532-3857; Norcross: Varsity 446-3434; Macon: Computer Source 474-5166; ComputerLand 474-1410. **IA:** Dubuque: Computers Plus 556-6150. **IL:** Chicago: Golden Rule 929-2592; Highland Park: Universal Computers 433-8930; Jacksonville: Computer Oasis 245-1461; Waterloo: Computer Helper 800-235-6646. **IN:** Fort Wayne: Grahm Computer 423-3422; Marion: Computer Store 662-9994. **KS:** Emporia: Mr. Computer 342-4893. **KY:** Lexington: Lexington Computer 268-1431; Alexandria: Delta Computers 442-0217; Matairie: Computer Shoppe 454-6600. **LA:** Shreveport: Compco Computer 869-1282. **MA:** Acton: Acton Computer Center 263-3600; Boston: Sherman Howe 423-6787; Cambridge: Tech Computer 497-0395; Chicopee: Custom Computers 594-6682; Lynn: Land of Electronics 581-2700; Newton: Micros Unlimited 964-0202; Sherman Howe 965-8970; Peabody: Computers, Etc. 535-5252. **MD:** Gaithersburg: MacCorner 330-9116; Laurel: Comm Center 792-0600; Wheaton: Computer Crafters 933-5820. **MI:** Ann Arbor: Learning Center 996-1616; Farmington Hill: Retail Computer Center 626-3240. **MN:** Baxter: Computer One 828-4650; Hutchinson: Hutch Computer Inc. 587-2940; Manchester: United Computer 391-9409. **MS:** Meridian: ComputerLand 482-8523; 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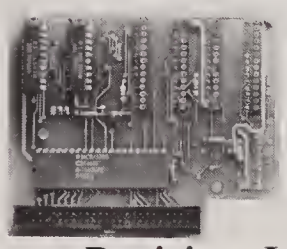

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Internal drives save desktop space, but there are serious trade-offs. First, you lose your system while the drive is installed. Worse, you lose your system if the drive needs repair. (Internal drives have earned a not undeserved reputation for frequent breakdowns.)

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DataFrame sits *beside* the Mac, uses a vertical 'chimney' design to vent heat, needs no fan, and therefore stays cool *silently*.

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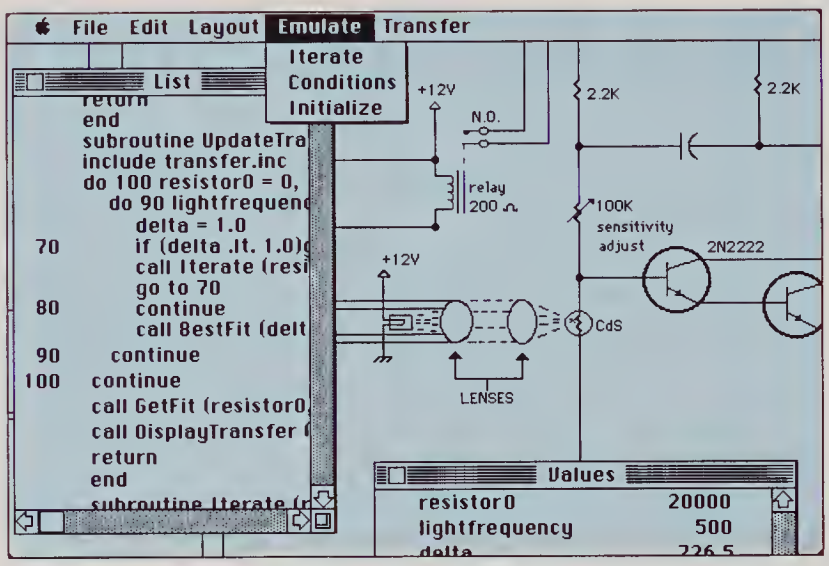

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Also, *MacDraw* seems to identify fonts in a document by their positions on the Font menu, not by their names. Suppose, for example, I type some text in a *MacDraw* document using Chicago, which is the first font on my *MacDraw* Font menu. Then I quit *MacDraw* and use the Font/DA Mover to add the Los Angeles font to the System file. When I reopen the *MacDraw* document, Los Angeles is at the top of the Font menu, and the text I typed in Chicago has been converted to Los Angeles.

Bill Stewart
Norcross, Georgia

System Error ID Codes

ID Code	Meaning
1	Bus error: a memory reference problem occurred on a Mac XL or on a modified Mac or Mac Plus.
2	Address error: the program referred to an odd memory address.
3	Illegal instruction: the MC68000 microprocessor encountered a machine language instruction it did not recognize.
4	Zero divide: a machine language instruction Signed Divide (DIVS) or Unsigned Divide (DIVU) had a divisor of zero.
5	Check exception: the machine language instruction Check Register Against Bounds (CHK) failed; perhaps a Pascal "value out of range" error occurred.
6	TrapV exception: the machine language instruction Trap On Overflow (TRAPV) failed.
7	Privilege violation: the Mac always runs in privilege (supervisor) mode; perhaps an erroneous Return from Execution (RTE) machine language instruction was encountered.
8	Trace exception: the trace bit on the microprocessor's status register is set.
9	Line 1010 exception: the 1010 trap dispatcher failed, making it impossible to use the ROM.
10	Line 1111 exception: an unimplemented machine language instruction was encountered; perhaps a leftover breakpoint from program debugging.
11	Miscellaneous exception: a nonspecific error condition caught by the microprocessor.
12	Unimplemented core routine: the microprocessor encountered a nonexistent trap number, perhaps a fictitious ROM routine.
13	Spurious interrupt: the interrupt vector table entry for a particular level of interrupt is NIL; this error usually occurs with level 4, 5, 6, or 7 interrupts.
14	I/O system error: the Mac's File Manager found a bad type field in an entry on an I/O request queue, the dCtlQHead field was NIL during a Fetch or Stash call in a custom driver routine, or a needed device control entry has been purged.
15	Segment Loader error: the GetResource procedure was unable to read a segment into memory.
16	Floating-point error: the halt bit in the floating-point environment word was set.
17-24	Can't read PACK resource into memory.
25	Memory full or fragmented: the Memory Manager was unable to fill the program's request for more memory.
26	Segment Loader error: the GetResource procedure encountered a nonexecutable resource or was unable to read 'CODE' segment 0 into memory for some other reason.
27	File map destroyed: the volume contains a block with a block number higher than the last block or lower than the first block on the volume.
28	Stack overflow error: a memory problem occurred because the stack expanded into the heap.

A. Apple knows about *MacDraw*'s font troubles. Although no *MacDraw* upgrade has been officially announced, one is in the works, and I can confidently speculate that it will allow you to choose from a larger selection of fonts and that it will not mix up fonts.

Incidentally, when I use *MacDraw* (version 1.7 or 1.9) on a Mac Plus that has 15 fonts in the System file on a SCSI hard disk, I see 11 fonts (not 9) listed on *MacDraw*'s Font menu. I have to scroll the menu to choose the 48-point size at the bottom of the menu, but the menu scrolling built into the Mac Plus ROM works. However, on systems with more fonts on the Mac Plus, I have seen the screwy scrolling you report. Because the Mac Plus ROM alphabetizes Font menus, font mixup is no longer related to a font's position in the Font menu; it's the font's position in the System file that matters.

Bomb Error Codes

Q. In the course of using my Macintosh, I often encounter system errors. I don't know what I am doing wrong, but the computer gives ID numbers to most of the errors. Could you please print a list of the ID numbers and what they mean?

Brian Kalt
Southfield, Michigan

A. When you stump the Mac, it displays the "serious system error" alert box—the one that shows a bomb icon in the upper-left corner and a mysterious number in the lower-right corner. These numbers translate to equally esoteric phrases. In most cases only someone who is intimately familiar with the program code for the Finder or the particular application software understands why a code might have appeared. But for the curious, the table "System Error ID Codes" lists interpretations for numbers 1 through 28.

Send questions to Get Info, Macworld, *555 De Haro St., San Francisco, CA 94107. Send electronic mail to CompuServe 70370,702 or The Source BCW440. All published submissions become the property of* Macworld.

Lon Poole is a Contributing Editor of Macworld. □

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MIDI Composer *(music record/playback)* 22.
Right•Word *(spell checker & thesaurus)* 69.
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Jazz Training 39.
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Batteries Included
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General Accounting 239.
BrainPower
Think Fast *(improves recall)* 23.
Chipwits *(robot simulation)* 26.
StatView *(statistics package)* 52.
Designscope *(electronic circuit design)* 129.
StatView 512+ *(req. external drive, 512k)* 179.
CAMDE
Nutricalc *(diet & nutrition analysis)* 49.
Casady Company
Fluent Fonts *(two-disk set)* 29.
Central Point Software
Copy II Mac *(includes MacTools)* 20.
Challenger Software
Mac3D *(3D graphics, CAD features)* 115.
Chang Labs
Rags to Riches Ledger call
Rags to Riches Receivables *(reqs. 512k)* call
Rags to Riches Payables *(reqs. 512k)* call
Inventory Control call
Rags to Riches Three Pak call
Cortland
Top Desk 35.
Creighton Development
MacSpell+ *(requires 512k)* 55.
Cricket Software
Statworks 79.
Cricket Graph 129.
DataViz
MacLink *(transfer Mac/IBM files)* 89.
Desktop Graphics
DrawArt *(MacDraw artwork, 512k)* 27.
DrawForms *(requires MacDraw)* 30.
Digital, etc.
Turbo Maccountant 299.
Dow Jones
Straight Talk 59.
Spreadsheet Link 62.
Market Manager PLUS 125.
Dreams of the Phoenix
Day Keeper Calendar 27.
Phoenix 3D 27.
Quick & Dirty Utilities Vol. 1 27.
Quick & Dirty Utilities Vol. 2 27.
Twelve-C Financial Desk Accessory 27.
Electronic Arts
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Quickset *(icon-driven accessory)* 27.
Quickword *(word processing tool)* 32.
MacGAS *(requires 512k, external drive)* 55.
1st Byte
Speller Bee *(spelling-learning tool)* 39.
KidTalk *(writing-learning tool)* 39.
Smoothtalker *(version 2.0)* 49.
Forethought
Factfinder *(free-form entry)* 79.
FileMaker *(custom forms & reports)* 99.
Fortnum/Southern
MacInooga Choo-Choo *(reqs. 512k)* 21.
FWB Software
Hard Disk Util 57.
Great Wave Software
KidsTime 27.
ConcertWare+ *(music composition)* 39.
The Art of Fugue *(Bach)* 12.
Haba/Arrays
Home Accountant *(reqs. external drive)* 52.
Hayden Software
I Know It's Here Somewhere 20.
Hayden:Speller 27.
MusicWorks 46.
Building Blocks 46.
Home Design 57.
Score Improvement System for the SAT 58.
VideoWorks & MusicWorks Bundle 58.
Commercial Interiors 114.
Ideaform
MacLabeler *(print disk labels)* 29.
Innovative Data Design
Paste-Ease *(requires MacPaint)* 35.
MacDraft *(requires 512k)* 139.
Kensington
Graphic Accents 29.
Type Fonts for Text 29.
Type Fonts for Headlines *(reqs. 512k)* 42.
Layered
Notes...For Excel 42.
Notes...For Jazz 42.
Front Desk *(scheduling & organizer)* 69.
Legisoft/Nolo Press
WillWriter *(prepare your own will)* 27.
Linguist's Software
Tech *(1000 different symbols)* 59.
FOREIGN LANGUAGE FONTS
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MacSemitic/Coptic/Devanagari 59.
MacKorean 59.
MacGreek 59.
MacHebrew 59.
MacHieroglyphics 59.
LaserGreek 79.
MacGreek/Hebrew/Phonetics 89.
Living Videotext
ThinkTank 512k *(outline processor)* 99.
Magnum
McPic - Volume 1 28.
McPic - Volume 2 28.
The Slide Show Magician 34.
Manhattan Graphics
Ready Set Go *(requires 512k)* 99.
Microsoft
Flight Simulator 32.
Learning Multiplan and Chart $39.
Chart 1.0 72.
Logo 1.0 75.
Basic 2.1 89.
Multiplan 1.1 105.
File 1.02 111.
Word 1.05 111.
Fortran 2.1 169.
Excel 1.0 225.
Miles Computing
Mac the Ripper - Volume III 27.
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The Luscher Profile 24.
The Perfect Score: SAT 47.
Monogram
Forecast *(tax planning)* 41.
Dollars & Sense 81.
Nevins Microsystems
Turbocharger *(requires 512k)* 39.
New Canaan MicroCode
Mac Disk Catalog II *(requires 512k)* 32.
Odesta
Helix *(requires 512k, external drive)* 125.
Double Helix special
Palantir
MacType *(supports Dvorak keyboard)* 26.
MathFlash *(math flash card drills)* 26.
WordPlay *(crossword puzzles)* 26.
Inventory Control 69.
inTouch *(communication to emulation)* 79.
PBI Software
Icon Switcher 14.
Icon Fun & Games Library 14.
Icon Business Library 14.
HFS Locater 27.
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Satori
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MacOneWrite *(accounts receivable)* 137.
MacOneWrite *(general ledger)* 137.
Silicon Beach Software
Accessory Pak 1 21.
Silicon Press *(printer utility, 512k)* 42.
Simon & Schuster
The Mac Art Department 24
Paper Airplane Construction Kit 24
Typing Tutor III 35.
SMB Development
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SoftStyle
Colormate Art *(color graphic images)* 25
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Business Filevision *(512k, external drive)* 199.

Think Educational
MacEdge II *(math & reading)* . . . . . 28.

TML Systems
TML Source Code Library . . . . . 59.
TML Pascal . . . . . 69.

TrueBasic
True BASIC . . . . . 89.
Algebra Utility . . . . . 36.
Calculus Utility . . . . . 36.
3D Graphics Utility . . . . . 36.

Videx
MacCalendar *(incl. reminder system)* . . . . . 52.

GAMES

Activision
Championship Star League Baseball . . . . . 22.
Hacker *(you're on your own!)* . . . . . 27.
Mind Shadow *(Who am I?)* . . . . . 27.
Borrowed Time *(murder mystery)* . . . . . 27.
Alter Ego *(become someone else)* . . . . . 36.

Ann Arbor Softworks
Grid Wars *(3D graphic arcade)* . . . . . 22.

Artworx
Bridge 4.0 . . . . . 21.

Bantam Electronics
Sherlock Holmes: Another Bow . . . . . 27.

Blue Chip
Millionaire *(stock market)* . . . . . 35.
Tycoon *(commodities)* . . . . . 35.
Baron *(real estate)* . . . . . 35.
Squire *(personal finance, reqs. 512k)* . . . . . 35.

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Broderbund Software
Lode Runner *(you'll never sleep!)* . . . . 24.
Ancient Art of War *(military strategy)* . . . . . 27.

CBS
Murder by the Dozen *(twelve mysteries)* . . 25.

Electronic Arts
Golden Oldies Vol. 1 *(software classics)* . . . 24.
Skyfox *(3D graphics)* . . . . . 27.
One on One/Dr J vs Larry Bird *(reqs. 512k)* 27.
Pinball Construction Set . . . . . 27.

Epyx
Rogue *(the mainframe classic!)* . . . . . 24.
Temple of Apshai Trilogy *(4 levels)* . . . . . 24.
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Perplexx *(scrabble-like game)* . . . . . 24.
Sargon III *(9 levels of chess)* . . . . . 29.

Infinity Software
Grand Slam *(tennis, reqs. 512k)* . . . . . 28.

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Seastalker
Junior level of difficulty . . . . . *each* 23.

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Enchanter Zork I Cutthroat
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Zork III Suspect
A Mind Forever Voyaging
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Fusillade *(arcade-maze)* $21
MacAttack *(3D tank simulation)* 27
Harrier Strike Mission *(3D flight simulation)* 27
MacWars *(3D space simulation)* 27

Mindscape
Rambo: First Blood Part II 24
James Bond 007: "A View to a Kill" . . 24
Stephen King's "The Mist" 24
Racter *(converse with your Mac!)* 27
Balance of Power *(world politics)* 30
Brataccus *(requires 512k)* . . . . . 30.
Uninvited *(mystery adventure)* . . . . . 30.
Déja Vu *(murder mystery)* . . . . . 33.

Origin Systems
Exodus: Ultima III *(fantasy adventure)* . . . 38.

PBI Software
Strategic Conquest *(war strategy)* 29
Fokker TriPlane Flight Simulator . . . . . 35.

Polarware
Transylvania *(rescue Princess Sabrina)* . . . 15.
Crimson Crown *(sequel to above)* . . . . . 15.
Sword of Kadash *(fantasy adventure)* . . . . 15.
The Quest *(beware of the dragon!)* . . . . . 15.
Xyphus *(role playing adventure)* . . . . . 15.

Practical Computer Applications
MacGolf *(requires 512k)* . . . . . 36.

Psion
Psion Chess *(3D and multi-lingual)* . . . 31.

Sierra On-Line
Frogger *(classic video game)* . . . . . 24.
Championship Boxing *(knock 'em out!)* . . . 24.
Ultima II *(role playing adventure)* . . . . . 35.

Silicon Beach Software
Airborne! *(digitized-sound war game)* . . . 20.
Enchanted Scepters *(text & graphics)* . . . . 21.

Simon & Schuster
Star Trek—The Kobayashi Adventure . . . . 24.

Sir-Tech
Mac Wizardry *(fantasy)* . . . . . 36.

Spectrum Holobyte
GATO *(submarine simulation)* . . . . . 26.
Orbiter *(requires 512k)* . . . . . 27.
Tellstar North Level I *(reqs. 512k)* . . . . . 27.

Unicorn
Futuria *(sci-fi adventure)* . . . . . 24.
Animal Kingdom *(ages 6-12)* . . . . . 27.
Decimal Dungeon *(math, ages 9 and up)* 27.
Fraction Action *(arcade style math game)* 27.
Mac Robots *(pre-school program)* . . . . . 27.
Read-A-Rama *(reading, ages 5-8)* . . . . . 32.

Videx
FunPak *(Solitaire and more)* . . . . . 23.
MacCheckers/Reversi . . . . . 28.
MacGammon/Cribbage . . . . . 28.
MacVegas *(7 casino games)* . . . . . 34.

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Circle 4 on reader service card

ywhere else.

HARDWARE

Assimilation
Mac•Epson•Connection ..... $40.
Mac•Port•Adaptor ..... 85.
Numeric•Turbo ..... 145.

Compucable
Mac to Hayes Smartmodem cable ..... 16.
Mac Plus to Hayes Smartmodem cable 19
Mac Plus to Imagewriter II cable ..... 21.

Cuesta Systems
Datasaver AC Power Backup *(90 watts)* ..... call

Curtis Manufacturing
Diamond *(6 outlets)* ..... 29.
Emerald *(6 outlets; 6 ft cord)* ..... 36.
Sapphire *(3 outlets; EMI/RFI filtered)* ..... 47.
Ruby *(6 outlets; EMI/RFI filtered; 6 ft cord)* 55.

Epson
AP-80 printer *(Imagewriter compatible)* ..... call
FX-85 printer ..... call
FX-286 printer ..... call
LQ-1000 printer *(letter quality)* ..... call

Ergotron
MacTilt *(includes external drive bracket)* ..... 75.
MacBuffer 256k ..... 219.
MacBuffer 512k ..... 319.
MacBuffer 1 Megabyte ..... 489.

Hayes
Smartcom II *(communications software)* ..... 89.
Smartmodem 1200 ..... call
Smartmodem 2400 ..... call
Transet 1000 ..... call

IOMEGA
Bernoulli Box *(dual 10-MB w/SCSI)* ..... 2195.
Bernoulli Box *(dual 10-MB storage)* ..... 2475.
10 Meg cartridge ..... 48.

Kensington
External Disk Drive Cover ..... 8.
Mouseway ..... 8.
Mouse Pocket ..... 8.
Mac (Plus) Dust Cover ..... 9.
Imagewriter (II) Dust Cover ..... 9.
Mouse Cleaning Kit w/Mouse Pocket ..... 16.
Universal Printer Stand ..... 17.
Disk Case *(holds 36 Mac disks)* ..... 19.
Disk Drive Cleaning Kit ..... 19.
Tilt/Swivel ..... 22.
Polarizing Filter ..... 31.
Surge Suppressor ..... 35.
Starter Pack *(includes Tilt/Swivel)* ..... 53.
A-B Box *(specify Mac or Mac Plus)* ..... 62.
Control Center ..... 62.
System Saver Mac ..... 65.

Koala Technologies
KAT Graphics Tablet ..... 139.
MacVision *(digitizer)* ..... 175.

Kraft
QuickStick *(Mac joystick)* ..... 45.

Micah
MicahDrive AT *(20 Meg internal drive)* ..... 1195.

Mirror Technologies
FastPort *("SCSI" for your 512k Mac)* ..... 139.
MagNet 20x External Drive w/cable ..... 939.

Mouse Systems
A+ Optical Mouse ..... 59.

N² Products
Mac-Modem cable *(6 feet)* ..... 19.
Mac-Transet 1000 cable *(9 feet)* ..... 19.
Mac (Plus)-Printer cable *(6 feet)* ..... 19.
Mac Plus Adapter cable ..... 19.
Mac Plus-SCSI cable ..... 24.

Paradise Systems
Mac 10 *(10 megabyte hard disk)* ..... call
Mac 20 *(20 megabyte hard disk)* ..... call

PBI Software
Switch Box ..... 36.

Personal Computer Peripherals
MacBottom 20 Hard Disk Drive ..... 949.

PKI
McD 800k External Drive ..... 249.

Summagraphics
MacTablet 6" x 9" ..... 269.
MacTablet 12" x 12" ..... 369.

Systems Control
MacGard *(surge protection)* ..... 55.

Thunderware
Thunderscan *(high-resolution digitizer)* ..... 175.
Mac Plus Power Accessory ..... 29.

Western Automation
DASCH RAMdisk 500k ..... 299.
DASCH RAMdisk 1000k ..... 359.
DASCH RAMdisk 2000k ..... 435.

DISKS

Single-sided Diskettes

BASF 3½" Disks *(box of 5)* ..... 10.
Memorex 3½" Disks *(box of 10)* ..... 17.
Sony 3½" Disks *(box of 10)* ..... 17.
Verbatim 3½" Disks *(box of 10)* ..... 17.
MAXELL 3½" Disks *(box of 10)* ..... 18.
Fuji 3½" Disks *(box of 10)* ..... 18.
3M 3½" Disks *(box of 10)* ..... 21.

Double-sided Diskettes

Fuji 3½" Double-sided Disks *(10)* ..... 26.
Sony 3½" Double-sided Disks *(10)* ..... 26.
Verbatim 3½" Double-sided Disks *(10)* ..... 26.
MAXELL 3½" Double-sided Disks *(10)* ..... 28.
3M 3½" Double-sided Disks *(10)* ..... 29.

INFORMATION SERVICES

Compuserve
Compuserve Information Service ..... 27.

Dow Jones
Dow Jones News/Retrieval Membership Kit 19.

Source Telecomputing
The Source *(subscription & manual)* ..... 30.

ACCESSORIES

Automation Facilities
Floppiclene Drive Care Kit ..... 15.
MacPak Complete Care System ..... 29.

Clean Image Ribbon Co.
Clean Image Ribbon Kit ..... 12.

Computer Coverup
External Disk Drive Cover ..... 4.
Imagewriter (II) Cover ..... 8.
Mac (Plus) & Keyboard *(two covers)* ..... 10.

Diversions
Underware Ribbon ..... 9.
Colorpens ..... 10.
Jumbo Colorpens ..... 13.
ColorPack *(includes Colorpens)* ..... 19.

Environmental Software Company
The Clutch *(holds 8 disks)* ..... 9.
MACATTIRE (Rip-stop nylon covers)
External Drive Cover *(400k or 800k)* ..... 7.
Numeric Keypad Cover ..... 7.
Numeric Turbo Cover $8
Imagewriter (II) Cover ..... 11.
Wide Imagewriter Cover 13
Mac (Plus) & Keyboard Cover ..... 15.
Laserwriter Cover ..... 17.
Mac (Plus) & HD20 & Keyboard Cover ..... 18.

I/O Design
Imageware *(Imagewriter case)* ..... 39.
Imageware II *(Imagewriter II case)* ..... 49.
Imageware wide ..... 49.
Macinware Plus *(Mac Plus carrying case)* 59.

Innovative Concepts
Flip & File Micro *(holds 25 disks)* 9
Flip & File *(holds 40 disks)* ..... 18.

Innovative Technologies
The Pocket Pak *(holds 6 disks)* ..... 9.
The Easel *(holds 20 disks)* ..... 12.
The Disk Directory *(holds 32 disks)* ..... 18.

Kalmar Designs
Teakwood Roll-top Case *(holds 45 disks)* ..... 14.
Teakwood Roll-top Case *(holds 90 disks)* ..... 21.
Teakwood Printer Stand 24" 29

Magnum
Mouse Mover *(let your mouse ride!)* ..... 14.

Moustrak
Moustrak Pad *(standard 7" x 9")* ..... 8.
Moustrak Pad *(large 9" x 11")* ..... 9.
Imagewriter Pad ..... 12.

Ribbons Unlimited
Imagewriter Color Ribbons ..... 5.
Imagewriter Ribbons Six Pack ..... 25.
Imagewriter Rainbow Six Pack ..... 25.

Smith & Bellows
Mahogany Disk Case *(holds 90 disks)* ..... 28.

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The Accounting

Steve Mann

Here it is: the most comprehensive comparison of Macintosh accounting software ever prepared. The capabilities, the characteristics, the problems, the prices—over 150 evaluation criteria for 25 programs. If you're trying to make sense of the crowded Mac accounting market, let this survey be your guide.

Considering accounting's relative simplicity, the profusion of accounting software is overwhelming. The accompanying table, which pulls together information on over two dozen Mac accounting packages, provides an easy way to compare programs and sort out your options.

Using the Table

To select an accounting package, you have to know how your business works—what types of accounting transactions regularly occur, how the business is structured, what types of reporting requirements you have, and so on. First, determine what type of accounting you use—cash, accrual, or fund accounting. Most small businesses use either cash or accrual accounting or a combination of the two.

Next, to determine which modules you need, ask yourself what functions drive your business. For instance, almost all businesses need a general ledger, but only certain kinds of companies, like manufacturers and distributors, need an inventory module. Keep in mind that you can track almost any type of financial transaction with a general ledger. If you're not sure about a particular module, you probably don't need it. Those offered with each package are listed at the top of the Overall Information section.

Finally, for each module you need, list the features you think you must have and those that would be useful but not essential. A variety of factors will influence your choice of features. Here are a few of the most important considerations:

Organization. Most small businesses have simple organizational structures. You may, however, want to track profitability for different departments or profit centers. The Overall Information and General Ledger sections list a number of organizational considerations you should address.

If you have separate departments for accounting functions like accounts payable and accounts receivable, you probably need a multiuser package or one that offers separate modules. A single-user product with separate modules can often be used by two or more people with individual Macintoshes. The different sets of data can then be merged when necessary.

Transaction volumes. Pay careful attention to table entries indicating maximum volumes and transaction sizes. You should have a rough idea of how many account numbers you currently need, how many transactions you generate, and how many customers, vendors, and employees you have. Make sure you select a package that can handle those volumes for each module, and be sure to consider the growth you expect over the next few years.

Dollar limits. Most accounting products limit the size of dollar entries. Make sure that each module you buy can handle your largest single number and your largest year-to-date cumulative amount.

A word of caution: for some programs, the maximum number of digits per dollar entry is also the maximum number the program can handle, period. Also, a limit of 11 digits may not mean a program can handle entries as large as 999,999,999.99. Some programs may allow a maximum entry of only 222,222,222.22, for example. If you have any doubt, be sure to ask the vendor.

Transaction types. Different accounting modules enable you to enter specific types of transactions. For instance, the basic purpose of an accounts receivable module is to bill customers and track the receipt of payments.

Within each type of module, special transaction types may or may not be available. For instance, the Accounts Receivable section of the table includes information on sales commission and sales tax calculations, finance charges, partial payments, and so on. Browse through each section looking for any special transaction types you may need.

Reports. While the table provides information on certain types of printed output, such as invoices, mailing labels, W2 forms, and checks, listing all the reports and formatting options of each program would have

Software Buyer's Guide

required a whole table in itself. Contact vendors for specific information about the report types and format options you require.

In addition, check the report formatting and custom reports information in each section of the table. You may be able to create your own reports or modify the standard reports to meet your needs. Also check the data export entry in the Overall Information section, as you may be able to export data from a module into a spreadsheet or database program to create special reports.

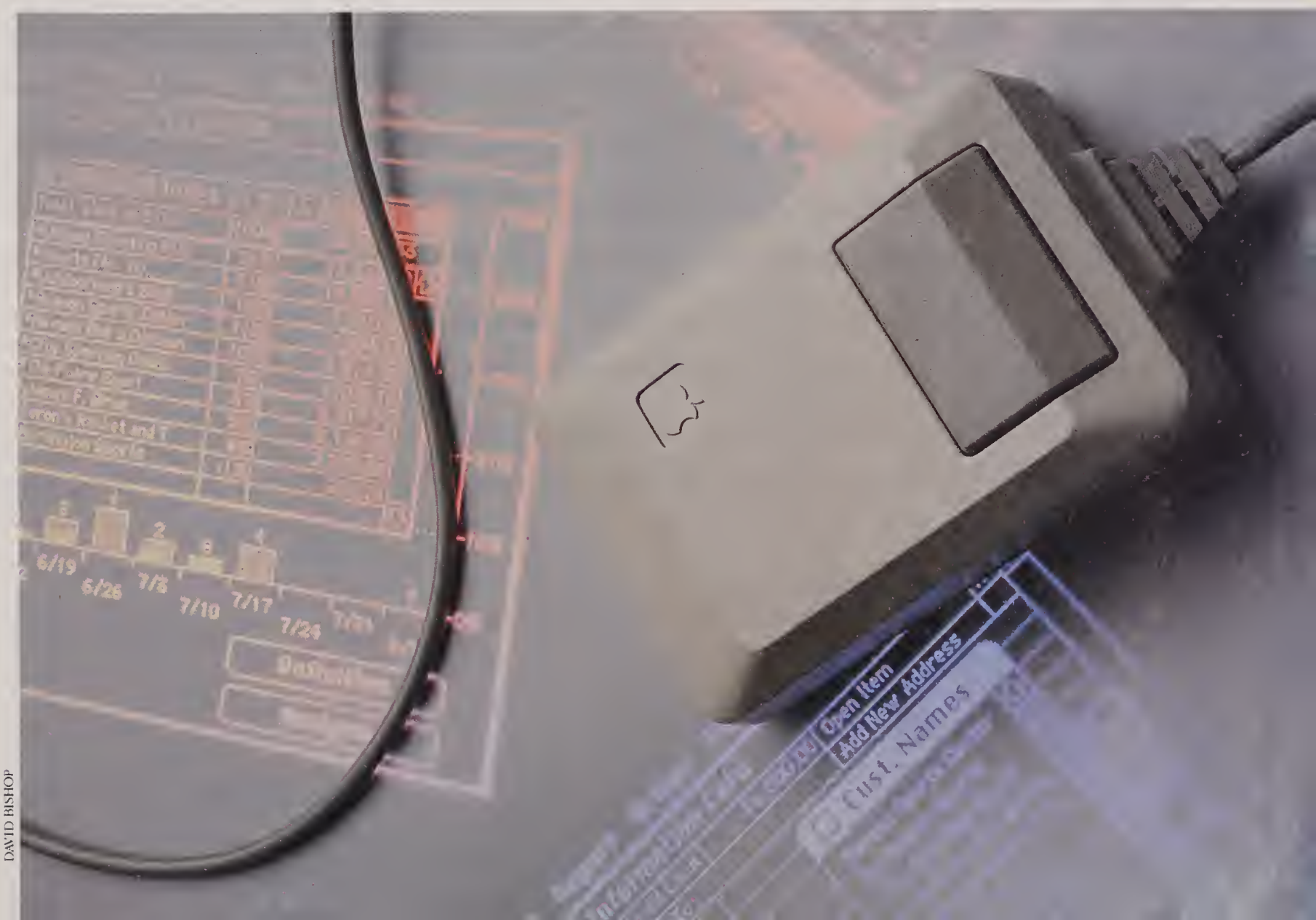
After examining the tables for the best possible fit between your requirements and the features of each program, you should be able to isolate those programs that are most likely to fulfill your accounting needs. Your next step is to contact the vendors or your dealer and ask for more detailed information. Also, because every program has subjective qualities that can be evaluated only by hands-on experience, ask for a demonstration disk, if one is available, or a dealer demonstration.

Caveats

Every attempt has been made to ensure the accuracy of all the information in the table. Unfortunately, because of the magnitude of the data collected, and because upgrades may have come out after this article went to press, the table may contain some inaccuracies. Accordingly, we advise you to verify a program's capabilities before making a purchase.

In addition, because of the table format's limitations, certain entries may not tell the whole story. For

(continues)



DAVID BISHOP

	Accountant Inc.	AMS General Ledger/ Checkmark Payroll	Back to Basics	dbsPay	Dollars and Sense	Gallery Finance	General Accounting	General Ledger for the Macintosh	Great Plains Hardisk Accounting Series	Insight	Maccountant
Overall Information											
Modules[1]	GL/AR/ AP/IN	GL/PR	GL/AR/ AP	PR	GL/CD/ CR	GL/AR/ AP/CD	GL/AR/ AP/PR	GL	GL/AR/ AP/PR/IN	GL/AR	GL/AR/ AP
Version	1	2.02/1.0	1.02	2	2	2.0	1	1.5	3.03	1	2
Multiple programs		●	●						●	●	
Cash/accrual/fund	c/a	c/a	c/a	c	c	c/a	c/a	c/a	a	a	c/a
One-write/double-entry	double	double	double	n/a	double	one	double	double	double	double	double
Passwords	●	●	●	●		●	●	●	●	●	●
Copy protected			●	●							
Help screens		●			●	some			●		●
Tutorials in manual	●	●	●		●	●	●		●	●	
Multiuser									●		
Max # of companies	disk	disk	1	1	disk	disk	disk	1	1	disk	1
Sample data included	●	●			●	some	●	●	●	●	some
Data export	●	●			●					●	●
Macintosh interface	●	●	●	●	●	●	●	●		●	●
Required RAM	512K	512K	128K	128K	128K	512K	512K	128K	512K	512K	128K
Hard disk required									●		
Toll-free calls			●[3]				●		●[3]		
Price	$300	$195/mod	$395 $175/mod	$395	$149	$229	$425	$245	$495/mod	$95/mod	$150
General Ledger				**n/a**							
Max # of accounts	99,999	1000	254		120	450	8000	disk	2000	disk	1000
Digits per account #	5	10	4		3	9	4	5	10	11	4
Max # of departments	n/a	9	10		3	n/a	10	n/a	n/a	999	99
Max # of profit centers	n/a	9	n/a		n/a	n/a	n/a	n/a	999	999	n/a
Max # of fiscal periods	12	12	12		12	12	12	varies	12	varies	12
Max # of transactions	disk	disk	4000/mo		2000	disk	disk	disk	disk	disk	disk
Max lines per transaction	12	no max	21		100	1	12	1	10	no max	no max
Max # of digits per $ entry[4]	12	11	9		6	10	12	11	10	10	10
Automatic recurring entries		●	●		●		●		●	●	
Budgeting	●	●			●				●		
Predefined account # ranges		●	●				●				
# of predefined reports	7+	10	14		7	3	8	8	12	7+	8
Report formatting						●				●	
Financial statement formatting		●			●	●	limited	●	●	●	
Custom reports					●					●	
Automatic reversals		●			●					●	
Produces graphs					●					●	
Max # of bank accounts	2	no max	3		12	1	no max	no max	no max	no max	5
Flexible posting		●			●	●				●	●

A bullet indicates that a program does have the feature in question; a space means it doesn't.

MacOneWrite	MacStore/ AP with GL	Open for Business I	Open for Business II	Palantir Financial Series	Personal Accountant	Plains & Simple	Rags to Riches	ShopKeeper	Strictly Business	Timecard	Turbo Maccountant	Versa Series	WOS Fund Accounting System
AR/CD	GL/AR/ AP/IN	GL/AR/ CD	GL/AR/ AP/IN	GL/AR/ IN	GL/CD/ CR	GL/AR/ AP	GL/AR/ AP/IN	AR/IN	GL	PR/CD	GL/AR/ AP/PR	GL/AR/ AP/PR/IN	GL/PR/ FA
2	1/1.03	1	1	3.1	2.3	1	2.6/1.0	1.33	1.85	1.82	1	2.02	1.0
•	•			•			•					•	•
c/a	c/a	c	a	c	c	c/a	c/a	a	c/a	c	c/a	c/a	f
one	double	double	double	double	double	one	double	n/a	double	n/a	double	double	double
	•	•	•					•	•		•		•
•					•				•				•
		•	•	•	•	•	some	•	•		•		•
•					•	•	•						•
													•
1	1	disk	disk	1	disk	disk	disk	disk	disk	disk	disk	1	1
•		•	•	some		•	•				some	some	•
		•	•	•			•		•	•	•		•
•	partial				•	•	•	•	•	•	•	partial	
512K	512K	512K	512K	128K	128K	512K	512K	512K	512K	512K	512K	512K	512K
		•	•									[2]	•
varies	•	•	•	•		•	•					•	
$250	$450/AR&	$495	$995	$145/mod	$100	$695	$200/mod	$80	$395	$200	$495	$99/mod	$4995
$130/mod	IN $500/											$150 GL	
	AP&GL												
n/a				MBASIC				**n/a**		**n/a**		MBASIC	
	disk	disk	disk	disk	disk	500	5000		disk		8000	disk	disk
	10	9	9	3	n/a	3-6	n/a		5		4	6	21
	n/a	99	99	n/a	n/a	n/a	99		99		99	100	disk
	n/a	n/a	n/a	n/a	n/a	n/a	n/a		99		n/a	n/a	disk
	12	12	12	12	1	varies	12		12		12	varies	12
	disk	disk	disk	disk	disk	3000/mo	10,000		disk		disk	disk	disk
	1	98	98	1	1	1	no max		n/a		no max	no max	no max
	11	10	10	11	10[5]	10	16		12		10	11	13
	•					•	•				•		
	•		•	•					•				•
	•				n/a	•	n/a						•
	10	10	15	10	5	8	10		15		9	9	2
						limited	limited						
	•	limited	limited	•			limited		•			•	•
						•	•						
									•		•		
	5	1 active	1 active	no max	no max	no max	no max		no max		5	1	no max
		•	•		•	•			•		•		•

[1] GL = general ledger, AR = accounts receivable, AP = accounts payable, IN = invoice, PR = payroll, CD = cash disbursements, CR = cash receipts, FA = fund accounting.
[2] Hard disk not supported.
[3] For paid support only.
[4] Includes cents.
[5] Maximum dollar amount = $20,000,000.00.

	Accountant Inc.	AMS General Ledger/ Checkmark Payroll	Back to Basics	dbsPay	Dollars and Sense	Gallery Finance	General Accounting	General Ledger for the Macintosh	Great Plains Hardisk Accounting Series	Insight	Maccountant
Accounts Receivable		n/a		n/a				n/a			
Max # of customers[1]	99,999		400		n/a	disk	8000		3000	disk	1000
Digits per customer #	5		6		n/a	4	4		7	10	4
Max # of transactions	disk		3500/mo		2000	disk	disk		disk	disk	disk
Max # of lines per transaction	12		10		100	1	16		16	no max	no max
Max # of digits per $ entry[1]	8		9		6	10[2]	12		10	10	10
# of aging periods	4		4		n/a	4	2		4	3	4
Separate prod. svc. table	•					•			•	•	
Tracks salespeople									•	•	
Calculates sales tax	•		•						•	•	
Calculates commissions									•	•	
Handles payment terms	3 types		•						•	•	
Calculates discounts	•					•			•	•	
Supports sales territories										•	
Open item/balance forward	both		bal		open	both	bal		both	both	n/a
Calculates finance charges	•		•						•	•	
Handles invoice adjustments	•		•		•	•	•		•	•	•
Handles partial payments	•		•		•	•	•		•	•	•
Automatic invoice numbering			•				•		n/a	•	n/a
Separate bill-to/ship-to	•					•			•	•	
# of predefined reports	10+		9		2	2	7		24	34+	2
Report formatting						•					
Prints invoices/statements	both		st		inv		inv		st	both	
Produces custom reports					•						
Prints mailing labels	•		•						•		
Credit limit processing	•		•						•	•	
Handles one-time customers					•		•				•
Produces graphs					•					•	
Accounts Payable		n/a		n/a				n/a		n/a	
Max # of vendors	99,999		300		disk	disk	8000		3000		1000
Digits per vendor #	5		6		n/a	3	4		7		4
Max # of transactions	disk		2000/mo		2500	disk	disk		disk		disk
Max # of lines per transaction	12		15		100	1	16		16		no max
Max # of digits per $ entry[1]	8		9		6	10[2]	12		10		10
Automatic recurring payments					•						
Voucher adjustments	•		•		•	•	•		•		•
Calculates discounts	•		•						•		
Manual checks	•		•		•	•	•		•		•
Selective voucher payment	•		•		•	•			•		•
Partial voucher payment	•		•		•	•			•		•
User-assigned check numbers	•		•		•		•		•		•
# of predefined reports	10+		12		2	2	7		21		3
Report formatting											
Prints checks	•		•		•		•		•		•
Produces custom reports					•						
Handles payment terms	•		•								
Credit limit processing	•										
Handles one-time vendors			•		•		•				•
Produces graphs					•						
Prints mailing labels	•		•						•		

MacOneWrite	MacStore/ AP with GL	Open for Business I	Open for Business II	Palantir Financial Series	Personal Accountant	Plains & Simple	Rags to Riches	ShopKeeper	Strictly Business	Timecard	Turbo Maccountant	Versa Series	WOS Fund Accounting System
					n/a				n/a	n/a			
disk	disk	disk	disk	disk		700	5000	disk			8000	1500	disk
6	25	n/a	n/a	4		n/a	n/a	10			4	5	21
disk	disk	disk	disk	disk		2500/mo	10,000	disk			disk	10,000	disk
9	no max	98	98	20		1	no max	10			disk	no max	no max
9	7	9	varies	11		10	16	8			10	9[3]	13
4	0	4	4	4		4	4	4			4	4	1
	●		●	●				●				●	●
	●							●			●	●	
●	●	●	●			●[4]		●			●	●	n/a
						●[4]					●		n/a
						●[5]					●[5]		n/a
●	●	●	●			●[6]		multiple			●[5]	●	n/a
			●										
both	open	both	both	both		both	open	open			both	both	both
●				●				●			●	●	n/a
●	●	●	●	●		●	●	●			●	●	●
●	●	●	●	●		●	●	●			●	●	●
●	●	●	●			●	●	●			●	●	n/a
	●		●								●	●	n/a
6	10+	10	8	5		8	9	8			5	8	5
						limited	limited						
st	inv	st	both	st		st	both	both			both	both	n/a
	●												
●	●		●			●		●			●	●	n/a
		●	●			●					●		n/a
		●	●			●		●			●		
											●		
				n/a	n/a			n/a	n/a				
disk	disk	disk	disk			300	5000			disk	8000	1000	disk
n/a	3	n/a	n/a			n/a	n/a			n/a	4	4	6
disk	disk	disk	disk			2500/mo	10,000			disk	disk	10,000	disk
1	3	98	98			1	no max			1	disk	1	no max
9	11	10	10			10	16			8	10	10	13
	●					●					●	●	
	●	●	●			●	●			n/a	●	●	●
	●	●	●			●					●	●	●
●		●	●			●	●				●	●	●
●	●	●	●			●				n/a	●	●	●
	●		●			●	●			n/a	●		●
●	●	●	●			●	●				●	●	●
6	8+	4	7			9	10			5	3	6	14
							limited						
●	●	●	●			●	●			●	●	●	●
													●
	●					●				n/a	●	●	●
						●				n/a			
						●				●	●		●
											●		
											●		

[1] Includes cents.
[2] Maximum dollar amount = $20,000,000.00.
[3] Maximum dollar amount = $1,000,000.00.
[4] With difficulty.
[5] One per customer.
[6] One per invoice.

	Accountant Inc.	AMS General Ledger/ Checkmark Payroll	Back to Basics	dbsPay	Dollars and Sense	Gallery Finance	General Accounting	General Ledger for the Macintosh	Great Plains Hardisk Accounting Series	Insight	Maccountant
Payroll	**n/a**		**n/a**		**n/a**	**n/a**		**n/a**		**n/a**	**n/a**
Max # of employees		100		2500			8000		250		
Digits per employee #		n/a		n/a			4		7		
Max # of transactions		disk		disk			disk		disk		
Max transaction lines per employee		1		24			10		20		
Max # of deductions per employee		9		12			n/a		24		
Pay period types		4		many			n/a		8		
# of deduction types		3		15			n/a		999		
Max # of pay categories per employee		9		16			n/a		26		
Handles manual checks				only			●				
# of state tax tables		6		1			n/a		50		
User-updated tax tables		●		●			n/a		●		
Calculates fed withholding		●		●					●		
Handles vacation and sick pay		●							●		
Tracks labor distribution									●		
# of predefined reports		5		10			4		42		
Prints W-2 forms		●							●		
Prints state tax reports		●							●		
Report formatting											
Prints checks		●					●		●		
Custom reports											
Produces graphs											
Inventory		**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**		**n/a**	**n/a**
Max # of items	99,999								6000		
# of digits per item code	5								15		
Max # of transactions	disk								disk		
# of flow assumptions	0								3[4]		
Costing methods	avg, last								std, last		
Max # of digits, quantity on hand	5								8		
Max # of digits, cost per item[1]	9								10		
Max # of digits, price per item[1]	9								11		
Max # of suppliers per item	no max								no max		
Max # of price types per item	1								5		
Max # of costs per item	1								2		
Handles inventory adjustments	●								●		
Handles subassemblies	●										
Reports reorder point	●								●		
Prints purchase orders	●										
Max # of decimals per cost	6								4		
Max # of decimals per price	6								4		
Calculates cost of goods sold	●								●		
Tracks freight	●								●		
Handles sales returns	●								●		
Multiple units of measure											
Supports standard costs									●		
Custom reports											
Supports inventory transfers	●								n/a		
# of predefined reports	1+								29		
Report formatting											
Interfaces to sales/purchases	both								both		

MacOneWrite	MacStore/ AP with GL	Open for Business I	Open for Business II	Palantir Financial Series	Personal Accountant	Plains & Simple	Rags to Riches	ShopKeeper	Strictly Business	Timecard	Turbo Maccountant	Versa Series	WOS Fund Accounting System
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a				
										disk	8000	800	disk
										n/a	4	n/a	8
										disk	8000	800	disk
										0	1	3	no max
										7	10	7	15
										7	none	4	6
										4/person	10	8	6
										4	4	3	5
											●		●
										1	0	50	50
												●	
										●	●	●	●
										●			●
													●
										17	2	6	10
										●	●	●	●
										●			●
										●	●	●	●
n/a		n/a			n/a	n/a			n/a	n/a	n/a		n/a
	disk		disk	disk			3000	32,000				disk	
	25		10	4			n/a	5				15	
	disk		disk	disk			50/day	disk				disk	
	0		0	0			0	0				0	
	avg		avg	avg			actual	avg				last, avg	
	4		5	11			5[2]	5				10	
	7		9	11			10[3]	5				10	
	7		9	11			10[3]	5				10	
	no max		n/a	n/a			n/a	n/a				1	
	1		1	2			1	1				2	
	1		1	1			1	1				2	
	●		●	●			●	●				●	
	●		●	●			●	●				●	
	●												
	6		2	2			2	2				2	
	6		2	2			2	2				2	
								●					
	●							●					
	●			●			●	●				●	
	●												
	n/a		●	●			●	n/a				n/a	
	10+		7	7			22	7+				7	
	both		sales					sales				both	

[1] Includes cents.
[2] Maximum-quantity-on-hand entry = 32,000.
[3] Maximum dollar entry per item = $21,000,000.00.
[4] Weighted average; first in, first out; last in, last out.

Phone Support Information

Product	Company	Phone Support	Phone
Accountant, Inc.	Softsync Inc.	Unlimited free support	212/685-2080
AMS General Ledger/Checkmark Payroll	Checkmark Software, Inc.	Unlimited free support	303/484-3541
Back to Basics	Peachtree Software	45 days free, then $20/call + $1/min. after 20 min.	800/554-8900, 404/564-5700
dbsPay	Summit Systems Inc.	Unlimited free support	617/344-1251
Dollars and Sense	Monogram	Unlimited free support	213/215-0355
Gallery Finance	Haba Systems	30 days free, then $50/quarter	818/994-1899
General Accounting	BPI Systems	60 days free, then $20/call or $75/5 calls or $295/yr.	800/531-5236, 512/328-5400
General Ledger for the Macintosh	Lake Avenue Software	30 days free, then $10/call or $200/yr.	818/792-1844
Great Plains Hardisk Series	Great Plains Software	30 days free, then $25/call or $650/yr. + $50 reg.	800/345-3276, 701/281-0550
Insight	Layered Inc.	30 days free, then $60/hr. or $125/10 hr. or $300/yr.	617/423-9041
Maccountant	Digital Etc., Inc.	Unlimited free support	213/452-5636
MacOneWrite	Sierra On-Line, Inc.	90 days free, then $30/yr./module or $100/yr.	800/344-7448, 209/683-6858
MacStore/AP with GL	Vertical Business Software Inc.	Unlimited free support	800/992-9914, 914/632-8305
Open for Business I	Open Systems, Inc.	$2.95/min.	800/328-2276, 612/829-0032
Open for Business II	Open Systems, Inc.	$2.95/min.	800/328-2276, 612/829-0032
Palantir Financial Series	Palantir Software	90 days free support	800/368-3797, 713/955-8880
Personal Accountant	Softsync Inc.	Unlimited free support	212/685-2080
Plains & Simple	Great Plains Software	30 days free, then $25/call or $200/yr. + $50 reg.	800/345-3276, 701/281-0550
Rags to Riches	Chang Labs	90 days free, then $75/yr.	800/972-8800, 800/831-8080 in CA
ShopKeeper	Woodtec	Unlimited free support	316/441-0187
Strictly Business	Future Design Software	Unlimited free support	714/891-9796
Timecard	Varo Design Group, Inc.	Unlimited free support	617/643-6135
Turbo Maccountant	Digital Etc., Inc.	45 days free, then $150/yr.	213/452-5636
Versa Series	H&E Computronics	60 days free, then $75/yr. or $50/6 mo.	800/431-2818, 914/425-1535
WOS Fund Accounting System	WOS Data Systems, Inc.	Unlimited free support	913/462-7581

instance, an entry might indicate that the number of general ledger accounts is limited only by disk space. However, this doesn't tell you just how many accounts you can enter before system performance degrades. Most vendors do not list that kind of information, so be sure to ask.

It's impossible to fully explain how to select accounting software in a thousand words or less. If you have any doubts, it might be a good idea to have your accountant or an independent consultant guide you through this process. Selecting a product and then converting from a manual to an automated system can require as little as a few hours to as much as several days. Once you have your system up and running, however, the time savings and flexibility you'll enjoy will more than make up for the effort. □

Acknowledgment

The author would like to thank several Peat Marwick colleagues without whom this article could not have been completed: Beth Gordon, Laura Doane, Doug Griscom, Debra Jackson, Doug Martin, and Jim Pierre.

Steve Mann is a microcomputer and accounting systems specialist employed by the San Francisco office of Peat, Marwick, Mitchell, & Co., the largest corporate user of Macintoshes in the world.

With reviews like these, who needs advertising?

STEWART ALSOP, P.C. LETTER:

"MicroPhone...sets the standards that general-purpose communications software will have to follow."

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"...powerful and easy to use. At the same time, MicroPhone offers a full plate of advanced features that should please seasoned communicators."

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"...it has many features designed to make it easy for a novice to get started...its many options make it a power user's delight."

FREIBERGER & ROBINSON, SAN JOSE MERCURY NEWS:

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  - *YMODEM*
  - *ASCII*
  - *1K BLOCKS*
  - *MACBINARY*
  - *MACTERMINAL 1.1*
- *Emulates TTY*
  - *VT52*
  - *VT100*
- *Capture file On/Off*
- *Append to file*
- *Printer On/Off*
- *Auto log on scripts for information utilities provided*
- *Scripts Invoked by Button*
  - *Menu*
  - *Command Key*
- *Scripts have full logic constructs*
- *Works with ALL Macintosh models & LaserWriter*
- *Supports TrailBlazer/Fastlink modem (up to 18,000 bps)*
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Circle 500 on reader service card

Enter the SCSI Drives

Lon Poole

Hot on the heels of Apple's Mac Plus announcement, nine manufacturers announced hard disk drives that attach to the Plus's SCSI port. With so many drives to choose from, deciding which one to buy is a challenge even for an experienced disk drive shopper.

For this review I tested nine SCSI drives: the AST 4000, the Bernoulli Box 10 + 10, the LoDown-20, the MDIdeas HD-20, the MagNet 20X, the MacFast20, the Sun Streak SCSI-21, the DataFrame, and the SlimLine 1010-2R. By the time I completed my tests, five other manufacturers had announced SCSI drives (see "SCSI Drive List" for a complete list of SCSI drive offerings).

Arriving at trouble-free performance is an evolutionary process with pioneer products. The first SCSI drives were no exception to the rule. Almost every drive had problems worthy of criticism. In addition, Apple's implementation of the SCSI interface caused some drive manufacturers trouble. However, during the two-month test period for this article, all the manufacturers corrected their drive malfunctions, worked around the SCSI port idiosyncrasies, issued improved utility software, and distributed better documentation. And at the end of the test period, Apple was about to release System 3.2. The new System reportedly includes fixes to the Mac's SCSI software, but I was unable to test the drives with it.

On Your Mark

Setting up a SCSI drive is a snap; plug the data cable into the drive and the Mac and plug the power cord into an outlet. All drives include both power cables and data cables, except the Bernoulli Box 10 + 10, the Sun Streak, the DataFrame, and the MagNet 20X, which lack data cables.

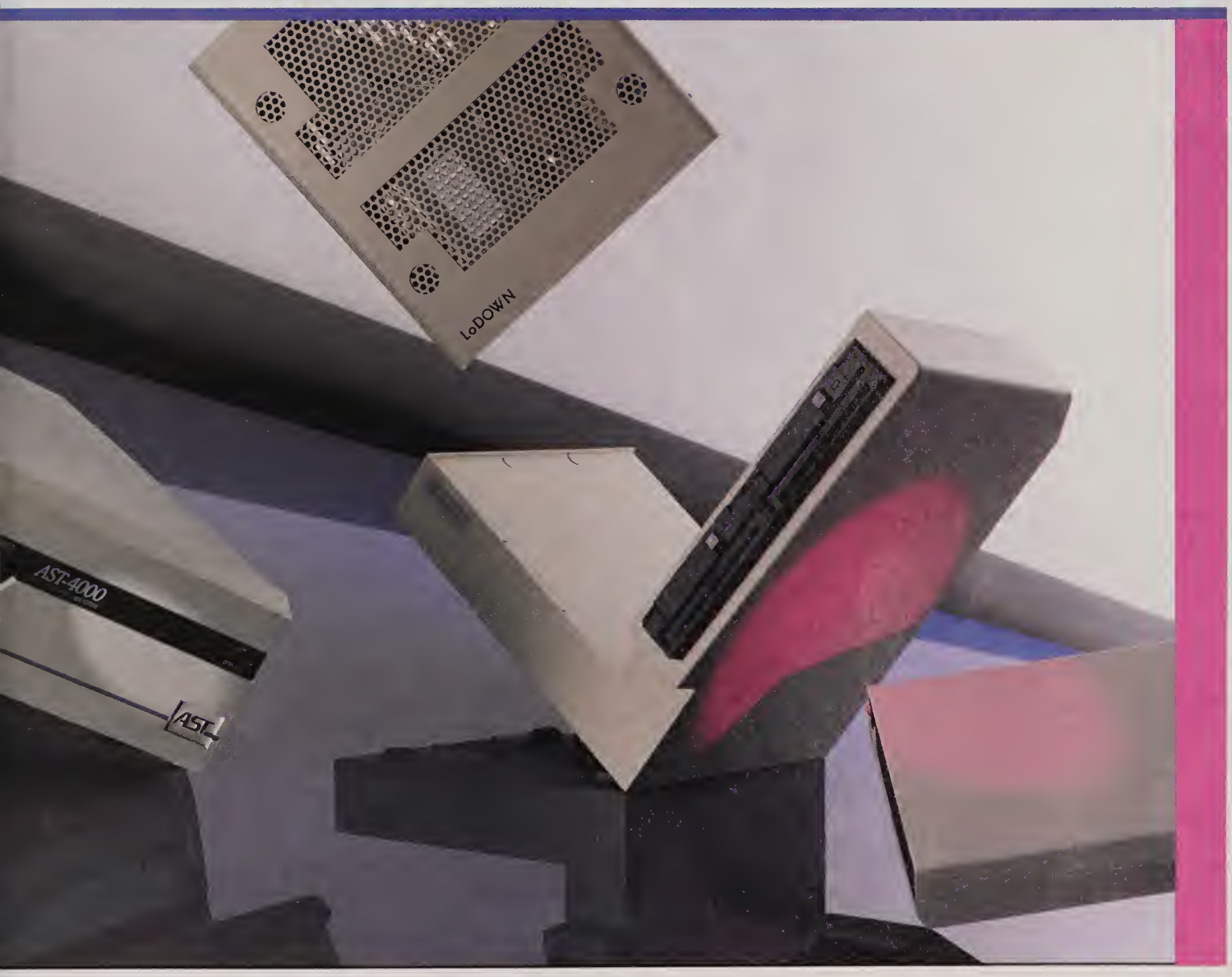
None of the drives tested require initialization, formatting, or other preparation.

None of the drives tested require initialization, formatting, or other preparation. Unless a floppy disk is inserted or an Apple Hard Disk 20 is attached to the floppy disk port, the Mac Plus uses the SCSI drive as the startup disk.

I ran each drive heavily for four or five days, with a sizable mixture of applications. The hard disks contained 13 megabytes of application programs and documents along with System 3.1.1, Finder 5.2, ImageWriter 2.2, and LaserWriter 3.0.

The Bernoulli 10 + 10, the LoDown-20, the MacFast20, and the DataFrame all require a special file from Apple, usually named SCSI Helper. If that file isn't present in the System Folder of the initial startup disk, the Mac sporadically locks up while starting applications and copying or duplicating files with the Finder.

(continues)



PHOTOGRAPHS BY FRED STIMSON

SCSI Drive List

Manufacturer	Model	Price	Capacity
AST Research, Inc. 2121 Alton Ave. Irvine, CA 92714 714/553-0340	AST 2000 base unit	$2795	20MB fixed with 20MB tape
	AST 2000 expansion unit	$1595	20MB fixed
	AST 2000 expansion unit	$2695	Two 20MB fixed
	AST 4000 base unit	$6995	74MB fixed with 60MB tape
	AST 4000 expansion unit	$3595	74MB fixed
Iomega Corp. 1821 West 4000 South Roy, UT 84067 800/446-6342, 801/778-3000 in Utah	Bernoulli Box 10	$1795	10MB removable
	Bernoulli Box 10 + 10	$2695	Two 10MB removable
	Bernoulli Box 20	$2395	20MB removable
	Bernoulli Box 20 + 20	$3495	Two 20MB removable
LoDown Inc. P.O. Box 5146 Pleasanton, CA 94566 415/426-1747	LoDown-10	$795	10MB fixed
	LoDown-20	$995	20MB fixed
	LoDown-40	$1995	40MB fixed
	LoDown-80	$3995	80MB fixed
MDIdeas, Inc. 1111 Triton Dr. #205 Foster City, CA 94404 415/573-0580	HD-20	$1095	20MB fixed
	HD-30	$1595	30MB fixed
Mirror Technologies Inc. P.O. Box 304, 2209 Phelps Hugo, MN 55038 612/426-3276	MagNet 20X	$1295	20MB fixed
	MagNet Tandem 40	$2595	20MB or 40MB fixed with 40MB streaming tape drive
	MagNet 85X	$4995	85MB fixed with 40MB streaming tape drive
	MagNet 172X	$5995	172MB fixed with 40MB streaming tape drive
Peak Systems 1120 Capital of Texas Hwy. Austin, TX 78746 512/329-1020	Plus-20	$1195	22MB fixed
	Plus-30	$1595	31MB fixed
Peripheral Land 3677 Enochs St. Santa Clara, CA 95051 408/733-7600	PL20	$1195	20MB fixed
	PL30	$1495	30MB fixed
	PL80	$2390	80MB fixed
	MacFast20	$1595	20MB fixed with partitions and tape drive backup interface
	MacFast30	$1895	30MB fixed with partitions and tape drive backup interface
	MacFast80	$2890	80MB fixed with partitions and tape drive backup interface
	MacFast170	$4995	170MB unformatted
	MacFast2020T	$2495	20MB fixed, 20MB tape backup
	MacStor10	$2195	10MB removable

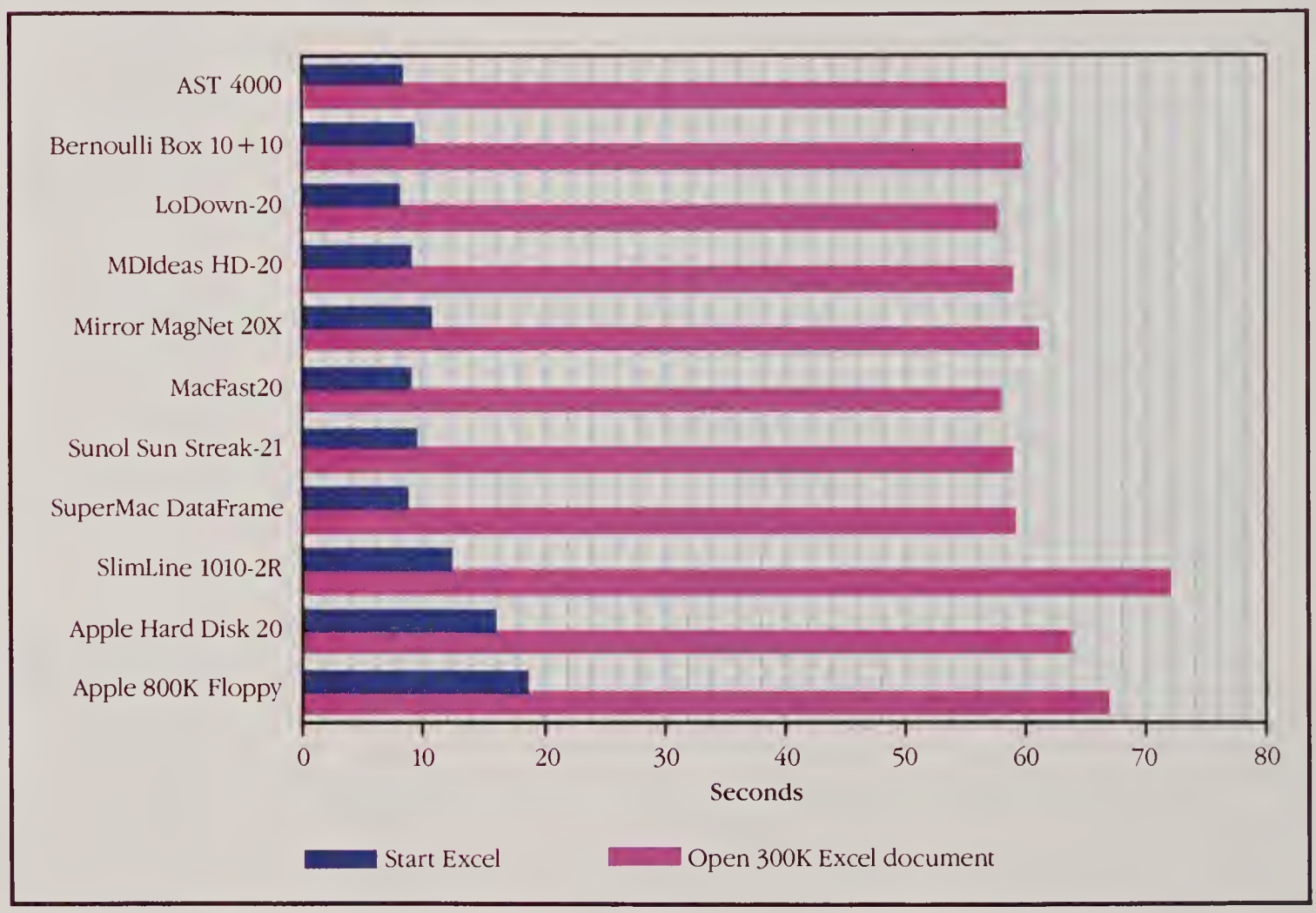
Manufacturer	Model	Price	Capacity
Personal Computer Peripherals Corp. 6204 Benjamin Rd. Tampa, FL 33614 800/622-2888, 813/884-3092 in Florida	MacBottom SCSI	$1195	21MB fixed
ProApp, Inc. 1475 S. Bascom Ave. Campbell, CA 95008 800/424-2425, 408/559-3552 in California	ProApp10 ProApp20	$795 $995	10MB fixed 20MB fixed
Rabbit Industries 206 W. 38th St. #224 Austin, TX 78705 512/473-2935	Magic20 Magic30 Magic40 Magic186	$1050 $1250 $1450 $4995	20MB fixed 30MB fixed 40MB fixed 186MB fixed, ultra high performance
Softworks Limited 2944 N. Broadway Chicago, IL 60657 312/975-4030	SD11A SD22A SD30A SD60A SD140X SD170X SD4000	$995 $1275 $1595 $2750 $6400 $7400 $4895	11MB fixed 22MB fixed 30MB fixed 60MB fixed 140MB fixed 170MB fixed 60MB with 60MB tape backup
Sunol Systems, Inc. 1777 Quarry Ln. Pleasanton, CA 94566 415/484-3322	Sun Streak SCSI-21 Sun Streak SCSI-45 Sun Streak SCSI-70 Sun Streak SCSI-110 Sun Streak SCSI-160	$2195 $4595 $5295 $6995 $8795	21MB fixed 45MB fixed 70MB fixed 110MB fixed 160MB fixed
SuperMac Technology, Inc. 1901 Old Middlefield Way Mountain View, CA 94040 415/964-8884	DataFrame	$1299	20MB fixed
Univation 1231 California Circle Milpitas, CA 95035 408/263-1200	SlimLine 10R SlimLine 1010-2R SlimLine 20 SlimLine 30 SlimLine 40 SlimLine 2010R SlimLine 3010R SlimLine 4010R	$2195 $3495 $1795 $1995 $2995 $2995 $3295 $4495	10MB removable Two 10MB removable 20MB fixed 30MB fixed 40MB fixed 20MB fixed and 10MB removable 30MB fixed and 10MB removable 40MB fixed and 10MB removable

Gauging SCSI Performance

Hard disks that attach to the high-speed SCSI port on a Mac Plus all operate faster than drives connected to a serial port or a disk port. Theoretically, SCSI drives should operate even faster than they do, but the Mac Plus cannot accept and process information as fast as a hard disk can send it through the SCSI port. The disparity between theoretical and actual transfer rates occurs because the Mac Plus periodically interrupts the flow of information to arrange the incoming program or document file in its memory.

Curiously, actual performance varies tremendously depending on file and folder organization and on what kind of information is being transferred. For example, a typical SCSI drive takes about 9 seconds to start the 372K *Microsoft Excel* application. In contrast, the same drive takes nearly 60 seconds to open a 300K *Excel* document.

To measure performance, I timed the nine SCSI drives, Apple's Hard Disk 20, and the Mac Plus 800K internal floppy disk drive to see how long each took to start *Excel* from the Finder and to open a 300K worksheet document from *Excel* (see "On the Test Track"). In each case, I made three timings and averaged them. All the hard disks had the same set of 1090 files organized in identical HFS folders. On most disks, they occupied just over 12 megabytes. The AST 4000, however, allocated disk space in larger chunks due to its high capacity and required about 13 megabytes for the same files. On the Bernoulli Box and SlimLine, both drives that utilize removable disk cartridges, the files were spread across two cartridges.



On the Test Track
The measured times for starting Excel *or opening a 300K* Excel *worksheet were comparable for all of the drives I tested. In everyday use, a 1-second difference is inconsequential.*

(System 3.2 reportedly circumvents the need for the SCSI Helper file.) The MagNet 20X requires a special version of the System file to work correctly.

During the test period, the disks all seemed to perform at about the same speed. To measure performance, I ran a series of timing tests, the results of which appear in "Gauging SCSI Performance." Many of the differences between drives, however, are most apparent when you compare the drives feature by feature (see "SCSI Drives at a Glance"). The following synopsis covers each drive's performance during the test period.

'What's that sound?' callers asked when the Bernoulli Box was idling in the background.

AST 4000

The 74-megabyte AST 4000 is best suited for sharing among several Macs on an AppleTalk network with disk- or file-server software such as Infosphere's *MacServe* or Centram's *TOPS*. It was the largest and the loudest drive I tested. The smaller, quieter AST 2000 stacks neatly under the Mac Plus and is more appropriate as a personal hard disk drive than the AST 4000. However, it was unavailable for testing at press time.

Using the versions of the System file, Finder, and AST 4000 Install File application that came with the drive, I occasionally had startup trouble that was easy to work around. After I installed System file 3.1.1, Finder 5.2, and AST's Install File 1.04, the drive worked faultlessly.

One unique feature of the AST 4000 is its built-in 60-megabyte tape drive. The included backup software dumps the entire 74 megabytes—whether it's all in use or not—onto two tapes in about half an hour, or it backs up individual files you select one by one. The software does not allow selection by folder, date, or file type. The AST 2000 also includes a built-in tape drive that reportedly backs up 20 megabytes in under 9 minutes and reads and writes individual files like a disk drive.

Bernoulli Box 10 + 10

"What's that sound?" callers always asked on the telephone when the Bernoulli Box was idling in the background. The drive ticks like a grandfather clock because the read/write head moves randomly to avoid wearing out one place on the disk.

With the Bernoulli Box you get the most flexible backup application program I have seen to date. For example, you can build a list of files to be backed up by name, date and time, kind, or a progressive combination of those criteria, and you can add or remove individual files from the list. You can have the program back up all files on the list or only those files that have changed since the last backup.

No problems turned up during the five days of heavy use. Because the Bernoulli Box was the easiest to daisy chain with all the other drives, I kept using it to copy a standard set of application and document folders to whatever drive I was about to test. Once, however, as I was about to copy files to another drive, the red light on the back of the Bernoulli Box went on, indicating an internal fuse had blown. Iomega product manager Greg Brashear explained that the internal fuse protects the SCSI bus's 5-volt line, which the Bernoulli Box augments. According to Brashear, Iomega is modifying the drive's design to correct the problem.

LoDown-20

The LoDown-20 performed well except for one problem: a bad spot developed on the disk. The disk error rendered an application unopenable and uncopyable. While I was able to discard the damaged application and recopy it from a floppy disk, the problem could have occurred in a more critical location that might have meant reformatting the entire disk.

March of the SCSI Soldiers
(Left to right) Bernoulli Box 10 + 10, DataFrame, and MDIdeas HD-20. The Bernoulli Box features two 10-megabyte removable cartridges. The quiet DataFrame sits next to the Mac, while the MDIdeas HD-20 fits nicely beneath the computer.

SCSI Drives at a Glance

	AST Research AST 4000	Iomega Bernoulli Box 10 + 10	LoDown LoDown-20	MDIdeas HD-20	Mirror Technologies MagNet 20X
Capacity of sample unit (formatted)[1]	73,350 bytes	19,218 bytes	20,334 bytes	21,670 bytes	21,496 bytes
Noise level (subjective)[2]	loud	loud	quiet	medium	medium
Number of ports	1	2	2	1	1
Type of connector	Amphenol 50-pin	Amphenol 50-pin	DB-25	Amphenol 50-pin	Amphenol 50-pin
Data cable included	yes	no	yes	yes	no
Convenience AC outlet	yes	yes	yes	no	no
Dimensions (H × W × D in inches)	5.5 × 14.5 × 17.25	6.25 × 12.5 × 17	3.5 × 10.25 × 11.75	3.75 × 10 × 12	3 × 5.375 × 9.25[4]
Backup software	limited[6]	elaborate	unavailable for test	adequate	unavailable for test
Standard warranty	180-day limited	90-day limited	90-day limited	90-day full	90-day limited
Price	$6995	$2695	$995	$1095	$1295
Additional features	60MB tape drive; dual voltage (120 VAC 60Hz or 240 VAC 50Hz)	removable disks	includes more than 300 public domain programs		includes MacServe file server and print spooler

Last but Not Least
(Left to right) Peripheral Land MacFast20, AST-4000, MagNet 20X. Peripheral Land's drive includes an intelligent tape drive controller. AST's drive stores 74 megabytes and includes a 60-megabyte tape drive. The MagNet 20X comes with Infosphere's MacServe *disk server software.*

The LoDown-20 was the quietest drive tested. However, the same factors that make it quiet—it has no fan and it sits beneath the Mac—appear to hinder the escape of hot air through the grillwork on top of the drive. According to LoDown spokesperson Kathy Anderson, heat-related failures are unknown in LoDown drives even when they run 24 hours a day. Despite this reassurance, I suspect that keeping the Mac and all other objects off the LoDown would enhance the drive's reliability and longevity.

In addition to the usual disk format and mount utilities, the LoDown-20 includes an interesting extra: 300 public domain applications, fonts, and desk accessories. A backup application is available from LoDown for $40.

MDIdeas HD-20

The MDIdeas HD-20 worked without a hitch. The moderately quiet, fan-cooled HD-20 resides in a cabinet that gives you several placement options, including stacking the Mac atop it. The HD Backup program included with the drive gives you two options: back up the entire hard disk onto floppy disks or copy just the files that have changed since the last backup.

The drive I received came with very little documentation, just a one-page instruction sheet. MDIdeas now ships a more complete manual, but I did not see it prior to press time.

MagNet 20X

The MagNet 20X from Mirror Technologies has the smallest cabinet of any drive tested. It also has a small remote power supply designed to sit up to 4 feet away from the drive. The first MagNet 20X that I tested, which had no fan, failed after a few hours of use. Mirror Technologies shipped a replacement unit that included a fan. Joel Ronning, president of Mirror Technologies, explained that although their test showed that the temperatures measured inside the cabinet

Peripheral Land MacFast20	Sunol Systems Sun Streak SCSI-21	SuperMac Technology DataFrame	Univation SlimLine 1010-2R
21,379 bytes	20,574 bytes	20,468 bytes	21,755 bytes
medium	loud	quiet	loud
2[3]	1	2	1
Amphenol 50-pin	Amphenol 50-pin	Amphenol 50-pin	DB-25
yes	no	no	yes
no	no	no	yes
3 × 9.5 × 9.5[5]	3.375 × 7.5 × 14.5	8 × 3 × 9.5	15.75 × 12 × 10.75
none[7]	none[7]	unavailable for test	unavailable for test
180-day full	6-month limited	1-year full	1-year limited
$1595	$2195	$1299	$3495
smart tape drive port; optional fixed-size MFS and HFS volume partitions			removable disks

[1] Capacity may vary slightly among different units of the same model due to different number of defective sectors.
[2] Noise varies markedly from one unit of the same drive to the next. If noise is a factor, try the individual unit before buying.
[3] Second port is for smart tape drive.
[4] Plus power supply cabinet, 2.625 × 4.125 × 6.5.
[5] Cabinet size of test unit was 3 × 6.875 × 15.25.
[6] Backup software works only with the built-in tape drive.
[7] Backup software comes with companion tape drive (not tested).

were well below the drive's published limits, a fan was added for insurance. Mirror claims that since adding the fan, it has had no reports of heat-related failures.

I experienced some additional heat-related problems with early versions of the software. Chuck Thiesfield, who wrote the Mirror software, explained that versions 1.61 and above make allowances for normal temperature changes as the drive warms up. In my tests the fan-equipped MagNet 20X with version 1.61 performed well.

The MagNet 20X comes with the *MacServe* disk and print server software created by Infosphere (see "Expanding Your Network Options," *Macworld,* June 1986). *MacServe* enables other Macs in an AppleTalk local area network to share the MagNet 20X. What's more, *MacServe* allocates part of the MagNet 20X for a print spooler so that you can continue working while printing documents.

MacFast20

Peripheral Land's MacFast20 can be set up as four 5-megabyte Mac File System (MFS) or Hierarchical File System (HFS) volumes or as a single 20-megabyte HFS volume. The MacFast20 also has a built-in provision for a smart external tape backup unit, Peripheral Land's MacFast20 Tape. Once a transfer between disk and tape begins, the Mac is free to do anything that does not require the disk or tape. I did not test the tape unit or the backup application supplied with it, but Peripheral Land claims the tape drive backs up 20 megabytes in under 5 minutes.

During the test period, Peripheral Land made a minor change to the drive's controller electronics and sent out Apple's revised SCSI Helper software to solve some performance problems with the MacFast20. With these changes, the MacFast20 performed reliably. Plans were also well underway to change the cabinet so that the MacFast20 would match the Mac Plus's footprint.

Sun Streak SCSI-21

The Sun Streak SCSI-21 I tested was a preproduction model, but there was nothing premature about its performance. It performed ably during the test period.

The Sun Streak cabinet is too narrow to stack under the Mac. You have to put this drive alongside the Mac or in some more remote location. The prototype's noisy fan made me favor a remote location, but Virginia Wurts, Sunol Systems' sales manager, assured me that production units would have quieter fans.

Because the Sun Streak was a prototype, it came with no manual and no utility software. Wurts says that a brief manual and formatting and diagnostic software will accompany the drive. Backup software comes only with Sunol's tape backup unit, the Sun Safe-60.

DataFrame

The DataFrame was the first drive I received and one of the few drives I tested that was completely trouble-free during the entire test period. Although it came with just a single instruction sheet, four weeks later that was replaced by a well-written, comprehensive manual. The DataFrame's greatest deficiency was scant utility software. Recognizing this, SuperMac plans to ship free backup, file security, and background printing utilities to all DataFrame owners by the time you read this review. I did not see any of the new software in time to test it.

The DataFrame runs hotter than the fan-cooled drives. However, the DataFrame uses the same time-tested cooling mechanism as a double-hung window. Hot air inside the cabinet rises, escapes through vents near the top of the cabinet, and sucks cooler air in through vents near the bottom. To check its cooling capability, I left the DataFrame running for four weeks straight, and it worked fine during that time.

SlimLine 1010-2R

The SlimLine I tested was a preproduction unit with two removable 10-megabyte hard disk cartridges. The drive worked fine as long as I inserted both cartridges and let them come up to speed before switching on the Mac. However, the drive wouldn't recognize any cartridges I inserted after startup, including those I ejected and later reinserted. According to Mike Higgins, Univation's director of marketing, the prototype contained a prerelease version of the drive's controller electronics. He assured me that production units would properly handle cartridge removal and insertion from the Finder. But you won't be able to swap cartridges quite as freely as you swap floppy disks.

The L-shaped Univation SlimLine drive cabinet wraps around a Mac Plus so that the two units look like one. The actual drives are stacked lengthwise in the upright part of the SlimLine cabinet on the right side of the Mac. The Mac-and-SlimLine combination stands only 2¾ inches taller and 2¼ inches wider than the Mac alone. Space conservation has its price, however. You give up peace and quiet to a moderately loud fan in the base of the SlimLine cabinet. Also, the SlimLine partly blocks the vents on the right side of the Mac. In spite of this, Higgins reports that the slight temperature rise inside the Mac presents no problem.

The DataFrame was one of the few completely trouble-free drives tested.

Shopping for Megabytes

In evaluating SCSI disk drives, consider the capacity, size, shape, noise level, warranty, and price that best suit your needs. Reliability is difficult to ascertain by testing a single unit. However, with the latest software, all the drives seemed reasonably reliable. Surprisingly, performance isn't a major comparison point because all the SCSI drives are limited by the Mac and run at nearly the same speed when performing everyday tasks.

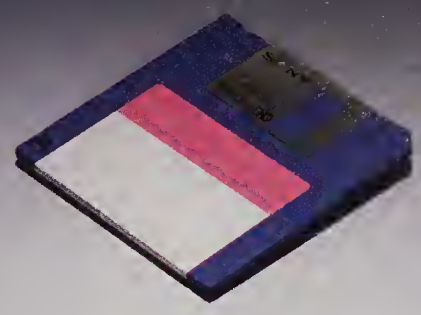
Four drives seem particularly suited to the individual user who is concerned about price: the LoDown-20, the MDIdeas HD-20, the SuperMac DataFrame, and the Mirror MagNet 20X. Businesses and other users who are more concerned with data security than price may prefer a drive with removable disk cartridges, namely the Iomega Bernoulli Box 10 + 10 or the Univation SlimLine 1010-2R. The Peripheral Land MacFast20 satisfies both the price-conscious and the security-conscious user; it costs a bit more than the low-priced drives but offers a couple more features, notably a provision for adding a smart tape backup. At the high end of the scale, the AST 4000 is ideal for businesses with large databases or AppleTalk networks. □

And Three Makes Six
(Left to right) LoDown-20, SlimLine 1010-2R, and Sun Streak SCSI-21. LoDown's drive comes with 300 public domain programs. The SlimLine 1010-2R's two drives are housed in an unusual L-shaped cabinet that wraps around the Mac. Sunol's drive sits alongside the Mac.

Lon Poole is a Contributing Editor of Macworld.

The inventors of the 3.5″ drive recommend only one floppy disk.

Theirs.



If your computer has 3.5″ drives, it has a little bit of Sony. Because Sony invented the 3.5″ drive technology that has taken floppy disk memory all the way to two megabytes.

So nobody knows better than Sony how important high standards are for producing 3.5″ floppy disks. But then, Sony invented those, too, as well as the most demanding methods for making 3.5″ disks.

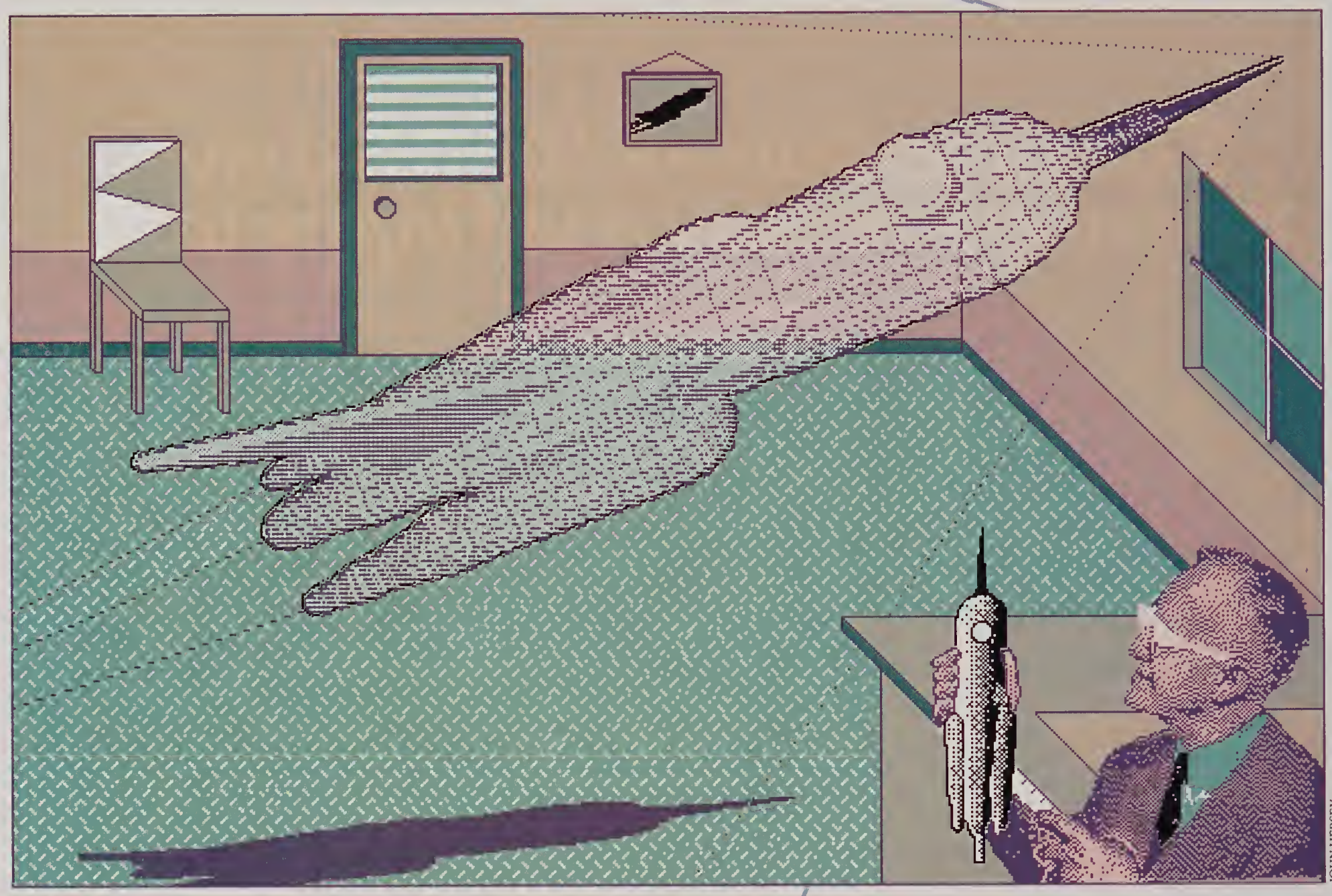
Such as the Sony Vivax™ magnetic medium, with the high coercive force necessary to suppress the "noise" that can cause disk error. And the Sony DDL™ binder system for incredibly even dispersion of magnetic particles on the disk surface. Then there's Sony's burnishing expertise that eliminates microscopic projections as small as 1/1,000,000th of a millimeter.

But the best reason to trust only Sony is your irreplaceable data. After all, you'll be storing six times the information on a disk that's one-third smaller than a 5.25″ floppy. That's why we recommend only one floppy disk for our 3.5″ drives. The Sony.

SONY®
THE ONE AND ONLY.®

© 986 Sony Corporation of America Sony, Vivax, DDL and The One and Only are trademark

Circle 255 on reader service card



JOHN HERSEY

Mac Modeling

Reese M. Jones

STELLA brings professional computer simulation and modeling to the Macintosh

Modeling and *simulation* may sound like arcane, information-age practices, but really they're as common and as old as thinking. Every time you put ideas together to figure out how something works, you're creating a mental model. When you use your ideas about how things work to make a prediction, you're engaging in simulation. The formal discipline of explicit modeling is no different—just more rigorous.

An explicit model is an abstract system that uses equations to describe the parts and behavior of a real system. Explicit modeling has long been performed on mainframes and minicomputers in the physical and biological sciences, business, economics, public policy, and many other fields. But in the personal computer world, modeling software has been restricted to very limited applications, such as spreadsheet programs and project managers. Now a new program from High-Performance Systems, *STELLA,* enables the Macintosh to be used for modeling applications as varied as evaluating airplane designs, estimating the effects of rent control on a local economy, or predicting the casualties from a nuclear disaster.

STELLA (*Structural Thinking, Experiential Learning Laboratory with Animation*) is a relatively complete environment for constructing and experimenting with explicit models. With its elegant, visual interface, it represents the first of a new type of modeling program that's accessible to relatively nontechnical users yet powerful enough to build substantial models with real-world applications.

The Diagram Window

STELLA's visual orientation makes it unique among modeling programs. You begin constructing a model by outlining its structure in the Diagram window (see Figure 1). *STELLA* diagrams have four main elements: The boxes, called *stocks* or *accumulators,* represent quantities that can grow or shrink as the model runs. The hollow arrows, known as *flows,* indicate movement in and out of the stock boxes. The circles attached to the flows are called *converters* or *logic receptacles;* these contain the decision rules that control the flows and, ultimately, the model's behavior.

The fourth element, the curved arrows, are the *input links,* or *signals.* Signals show logical connections between a model's components. In Figure 1, for example, revenues and expenses are both linked to profits.

STELLA is capable of handling complex models with multiple, convoluted feedback loops and numerous interacting factors. Models can extend beyond the edge of the screen; the display zooms out to show the overall structure of the model or in to enlarge a particular section. Also, when dealing with a complex diagram, you can search for a model's components by name.

Making the Rules

After you have pieced together your model on the Diagram window, it's time to define the contents of each stock box and

logic receptacle. *STELLA*'s defining dialog boxes are one of its most powerful features. The algebra box (shown at the top of Figure 2) tells you which parts of your model you must include in the current definition. The Required Inputs list is determined by the links you have drawn in your structural diagram and is one of the ways in which *STELLA* ensures that you maintain a one-to-one correspondence between your diagram and your equations. If you leave anything out of your equation, the program won't accept your definition.

The algebra box also shows a menu of built-in mathematical and logical functions that you can include in a definition simply by clicking on them. An on-line error-checking feature tells you when you have entered an equation incorrectly; unfortunately, you can't query the error checker to find out the correct format for a function before you enter it.

In addition to defining elements algebraically, the graph dialog box (shown at the bottom of Figure 2) lets you easily define a nonlinear response for a logic receptacle by specifying its input and output values. You can also use the mouse to draw a plot representing the relationship between the values. The combination of these defining tools gives you great flexibility when constructing complicated models with many feedback controls and nonlinearities. At the same time, you don't have to know calculus, solve sets of nonlinear partial differential equations, or do any programming.

Simulation

An important requirement for a simulation program is the ability to control the step size and numerical precision of the simulation. *STELLA* allows for great flexibility in setting these parameters. You can also choose simulation start and stop times, the ranges within which variables will be scaled for plotting or animation, and combinations of fixed or floating-point values with different precisions. The program even offers a selection of numerical-integration algorithms, including Euler's method and second- and fourth-order Runge-Kutta, that enable you to trade off speed and precision and deal with instabilities. This combination of features allows you to debug your model with a series of quick, approximate simulation runs before you do a longer, more precise calculation.

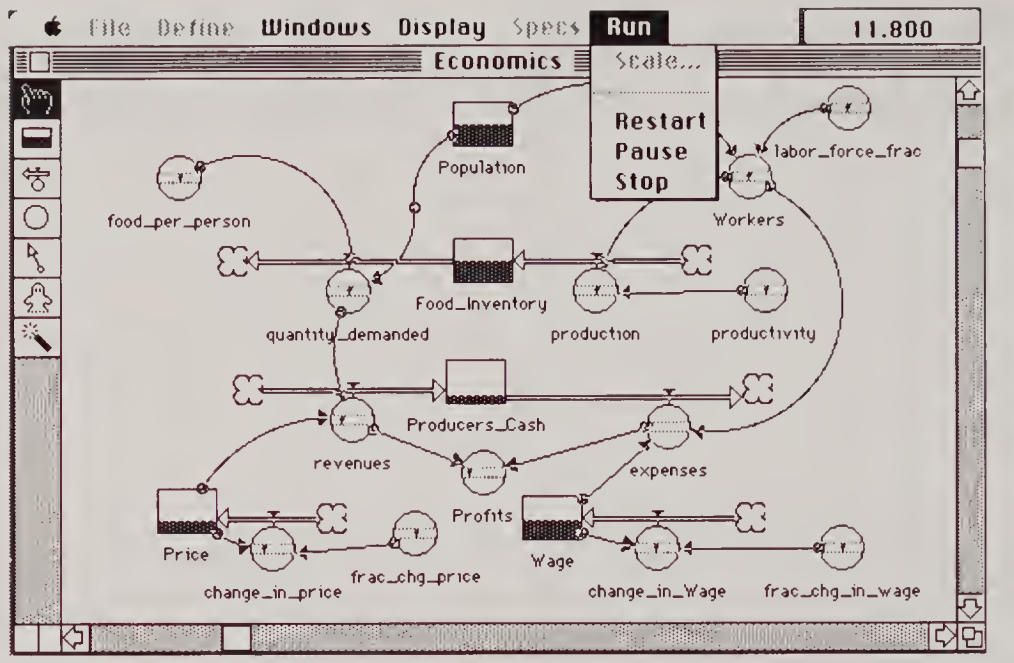


Figure 1
A diagram of a complex economic model with extensive interconnections and feedback-control loops. You construct a diagram by dragging elements from the toolbox on the left and arranging them in the window.

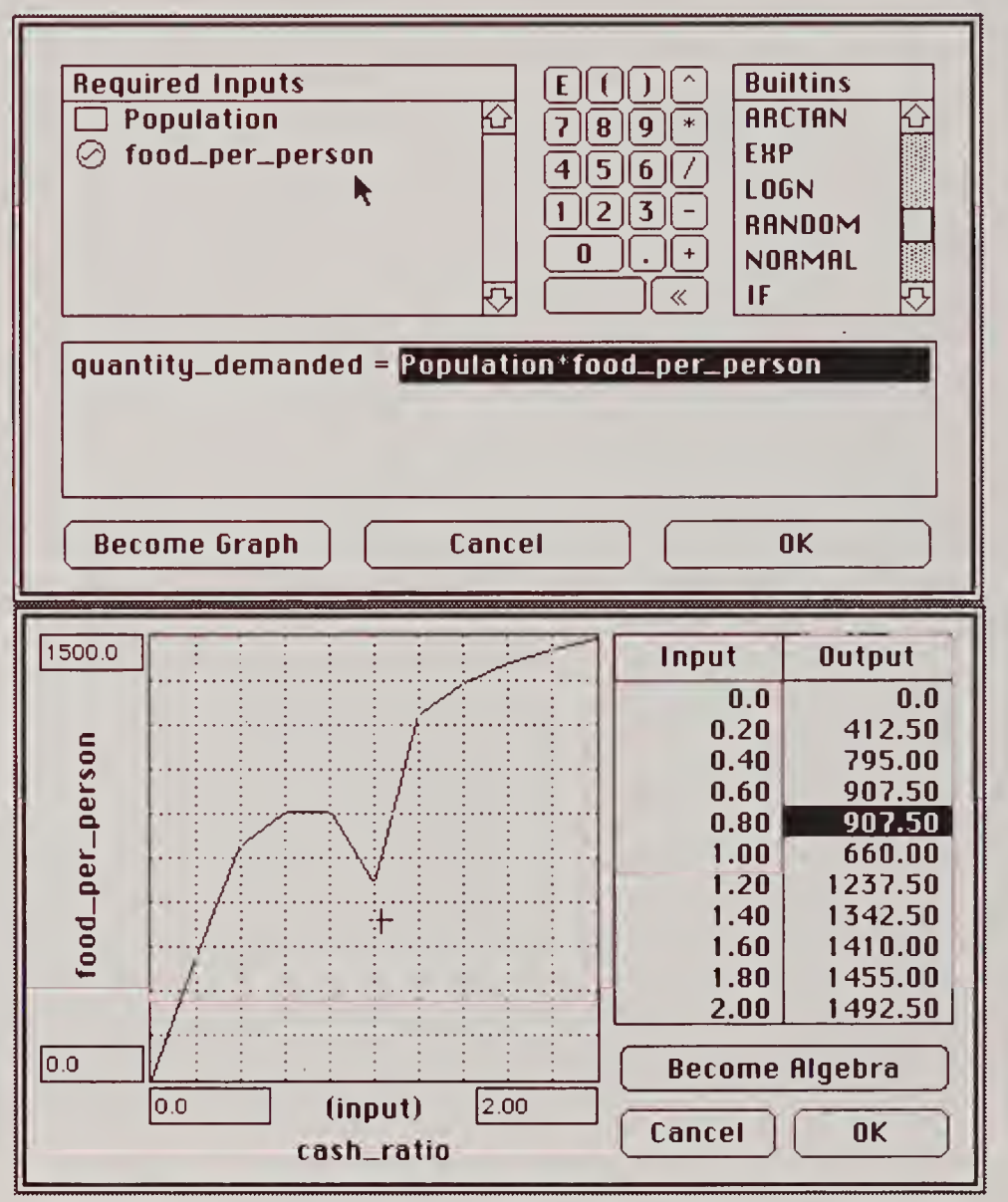


Figure 2
STELLA *offers two alternatives for defining the elements in a model: the algebra dialog box at top indicates which terms of your model you must include in your current definition and offers built-in mathematical and logical functions; the graph box lets you define nonlinear responses by either drawing a curve or entering values.*

Another important feature for a simulation program is the ability to produce graphic—even animated—output. Responses that are difficult to see in tables of numbers are often obvious in plots. Animation enables you to observe cycling phenomena and recognize early on if your simulation needs adjustments.

STELLA's output features are another of its strengths. You can plot the change in any value over time and watch as the program produces an animated graph (see Figure 3). *STELLA* can plot up to four independently scaled variables, and you can plot any variable against any other over time to display their relationship.

To set up a plot, you simply open the Graph Pad window and select the variables you want from a menu. To scale the graph, you can determine the ranges for every variable automatically by running through

a simulation cycle, or you can save time by letting the program determine the range for a single variable of particular interest. *STELLA* also lets you set plot-display ranges manually. This unusual variety of options makes it easy to compare the behavior of very different components of a model.

One stunning output feature is *STELLA*'s ability to animate the components of the structural diagram in the Diagram window. As the program runs, stock boxes fill up or empty to show changes in stock quantities over time. *STELLA* indicates the relative value of an equation in a logic receptacle by means of a moving speedometer needle (see Figure 1). You set the relative scaling of each variable for this animation in the same manner as you set the ranges for the plots.

Simulation results can also be displayed and printed in a traditional table format (see the Table window in Figure 3). However, *STELLA* cannot transfer tabular output to other programs—a serious drawback. *STELLA* does not support the Mac's Copy and Paste commands or provide a facility for printing a table to disk. This means you can't, for example, generate a data curve in *STELLA* and then move the data to a *Microsoft Excel* or FORTRAN program for analysis, or to *Cricket Graph* to make a presentation-quality graph. The only way to move a table, a diagram, or a plot from *STELLA* to *MacWrite* or *MacDraw* is to create a *MacPaint* bit map via a ⌘-Shift-3 screen dump. A business version of *STELLA* that addresses many of these shortcomings is in the works.

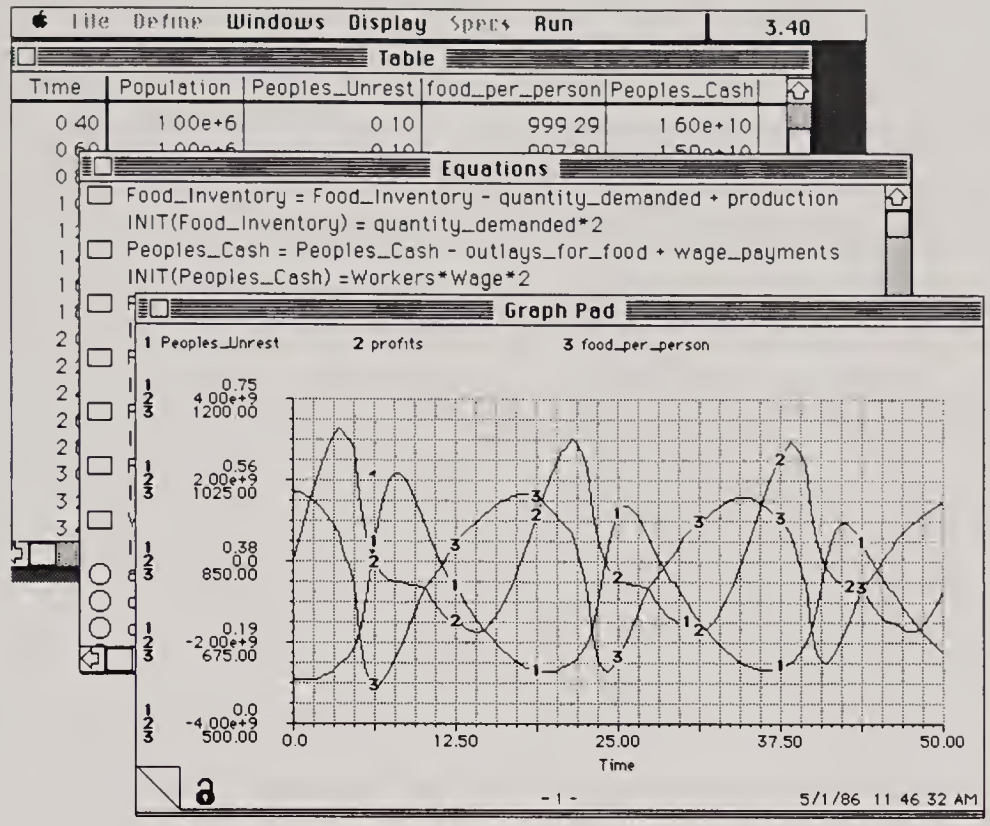


Figure 3
Three of STELLA's *output windows. The Graph Pad displays an animated plot of up to four components of your model. The Equations window shows a model's algebraic structure. And the Table window gives the numerical values of model components over time (the number in the upper-right corner indicates elapsed time).*

Documenting and Data Fitting

STELLA's model-documenting abilities are limited. You can display the equations used in a model in the Equations window, which is useful for debugging the model (see Figure 3). But *STELLA* automatically displays equations in order by type and then alphabetically within types—a scheme that most likely bears no relation to the structure of your model. Mainframe simulation programs often provide more flexible equation-listing capabilities, allowing you to add comments to equations and to sort and group equations based on the model's structure. Such features can be important when you're working with large, complicated models.

Once a model has been constructed and tested, it's often necessary—particularly for applications in the physical and biological sciences—to fit the model to a set of experimentally observed data to determine the exact quantities of unknown parameters in the model. *STELLA* is very useful for getting the structure and parameters of a model qualitatively correct, but its ability to determine the real-world value of variables is limited.

Evaluation

STELLA's documentation is structured as a series of tutorials that take several hours—and some effort—to complete. While this manual is well written and presents interesting insights into modeling theory and logical thinking, it lacks some key elements. There is no systematic overview of the program's features and, worse, no index. These omissions leave you with no way of answering specific questions; instead, you must thumb through the tutorials until you find the information you need.

The size of a model in *STELLA* is limited to the number of components that fit on one worksheet, which is partly a function of available RAM. *STELLA* version 1.2 works on a Mac Plus or a 512K Macintosh, but for most professional applications 512K will probably be unsatisfactory.

STELLA is an exciting and powerful tool that can be used in a variety of fields, from physics and biochemistry to psychology and public policy.

It is well suited for modeling and simulating dynamic systems and deals gracefully with the particularly difficult modeling task of multiple feedback loops. The program's graphic interface, animation, and sophisticated simulation-control features allow you to concentrate on the structure of your model rather than on the logistics of programming or mathematics.

If you have a model to develop, seriously consider *STELLA*. If you are interested in learning more about modeling and simulation, this program represents a relatively easy and inexpensive way to do so. □

Reese M. Jones is doing research in neurochemistry and brain imaging at Lawrence Berkeley Laboratory while working toward a Ph.D. in biophysics at the University of California, Berkeley. He is also president and founder of the Berkeley Macintosh Users Group.

STELLA, version 1.1
High-Performance Systems
13 Dartmouth College Hwy.
Rte. 1, Box 37
Lyme, NH 03768
603/795-4122
List price: $200

Beyond ThinkTank

Reed McManus

Does More really give you more for your money?

Who needs a $300 outliner? That's the question I asked myself when I first saw *More,* the successor to Living Videotext's *ThinkTank 512.* To its popular "idea processor," Living Videotext has added several disk utilities, a number of new outline-organization features, multiple windowing, graphics functions that enable you to generate bullet and tree charts automatically, and other improvements.

The not-too-surprising answer, as it turned out, is that *More* is a program for intensive outline users—people for whom conceptualization and organization are major job components and who like the outline format. *More* is not likely to replace *ThinkTank* in the near future among authors, researchers, teachers, and others who regularly use outlines. But it could be a key program for managers and other business professionals, helping them to coordinate their hectic workdays and to plan, present, and execute projects.

I looked at a prerelease version of *More.* The program's substantial features were up and running, but some disk utilities and file transfer functions were not. *More* requires 512K and two disk drives. It is not copy protected.

ThinkTank Plus

Those familiar with *ThinkTank 512* will immediately recognize *More*'s structure: headings with subheads are preceded by a plus symbol, and headings without, by a minus symbol. Flush-left or indented headlines can be created anywhere in an outline, and existing headlines can be moved anywhere, along with their subheads, simply by clicking and dragging. You can collapse an outline to study relationships between topics at the same hierarchical level or expand the outline to take in the details. Word processing or graphics windows can be attached to any headline.

More's outliner offers several organizing features not found in *ThinkTank 512.* Hoist lets you focus on a selected topic and work with it apart from the rest of the outline. Promote and Demote let you change the status of all subtopics below a selected heading without clicking on and dragging individual headings.

Cloning creates a cross-referenced copy of a headline; changes made to a heading are automatically reflected in its clone. For example, if you modify an entry in an alphabetical list of company names, the entry's clone in a list sorted by geographic region changes automatically.

Mark and Gather allow you to tag topics as you scroll through your outline and then move, copy, or clone the entire group. These features let you reorganize an outline without cutting and pasting items one by one. *More*'s Search function adds a wild-card capability and is useful for finding topics slated for gathering.

More Windows

More's multiple windows are its most significant outlining enhancement. Instead of trying to stuff all your ideas or projects into one outline, or closing an outline and opening a new file for each project, you can keep six windows cooking at one time (see Figure 1). This windowing ability en-

ables you not only to keep "desktop" outlines–address files, daily to-do lists, memo files–alongside project outlines, but to readily switch among them.

Windows can be overlaid or displayed side by side. Click on a window, and its outline becomes active; select Zoom In, and all other windows disappear. Data, including graphics, can easily be transferred between outlines and documents with the Clipboard or the Scrapbook.

Working with Words

More can handle all but the most intensive word processing tasks. Unlike *ThinkTank 512*'s word processing capabilities, *More*'s are neatly integrated into the outliner. You can attach a document window to any heading and use the Clipboard or the Scrapbook to transfer data between any document window and outline.

More's editing functions allow you to delete characters to the right of the cursor and to use keyboard commands for all editing. However, the program lacks an Undo command. In document mode, you can select any font and size in the System file, but you are restricted to plain text. (For outlines you can also choose among six font styles: plain, bold, underline, italic, outline, and shadow.) You can set tabs and choose either fixed-width or word-wrapped text. Page breaks are not shown on screen.

Instant Presentations

More's classiest act is its ability to automatically generate bullet and tree charts from an outline. When you select any outline heading, it and its subheads (including document and graphics windows) become a series of bullet charts or a tree chart suitable for presentations or desktop publishing.

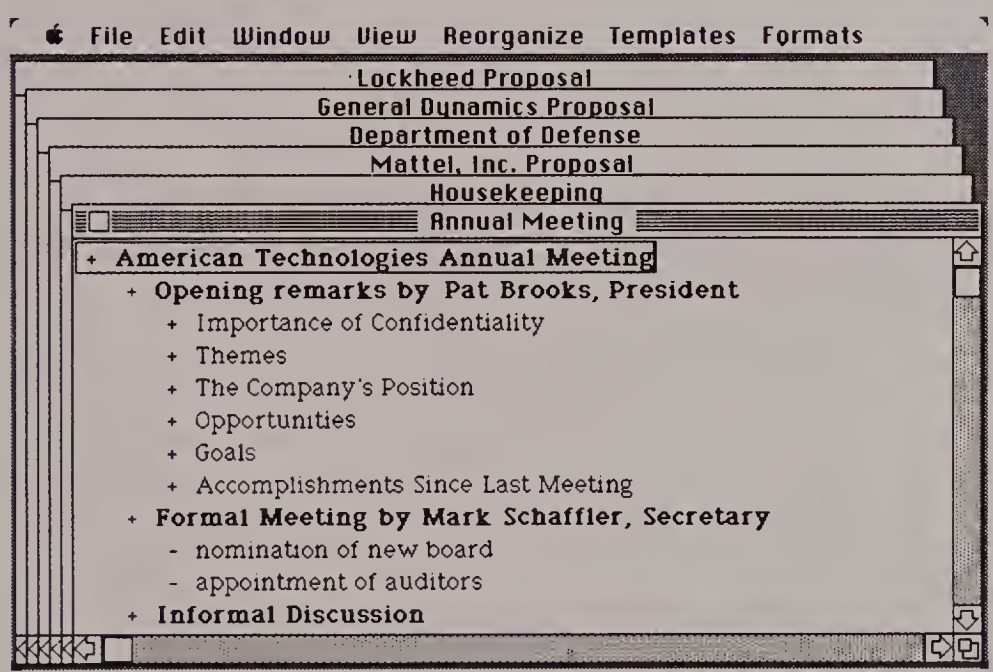


Figure 1
Multiple windows let you organize projects into separate but easily accessible outlines. Here, project proposals, annual meeting presentation plans, and daily organization files are each just a mouse click away. When you start More, *you can select a group of outlines from the desktop for the program to open at once.*

The bullet chart features a unique interactive palette that could be the forerunner of a new Macintosh standard (see Figure 2). To design a chart, you simply rotate through a variety of font, spacing, and decorative options, without making repeated selections. This instant visualization significantly speeds up the design process, enabling you to try a variety of options quickly and easily.

You can print bullet charts or queue up a series of charts to give an on-screen presentation. During presentations, you can let *More* scroll automatically through the slides at a designated pace or advance slides manually with a mouse click.

Tree charts are useful for such applications as organizational charts and project management flowcharts. An interactive palette similar to the bullet chart palette lets you select the chart's orientation, the size of its boxes, the style of links between boxes, the text alignment, the line thickness, and the display sizing—and see the results immediately (see Figure 3). Box sizes, box spacing, line patterns, and fill patterns can be changed using dialog boxes, and you can rotate fonts and font sizes using keyboard commands. Text is word-wrapped arbitrarily at the edge of a box unless you mark forced line breaks.

More files can be printed in six colors on an ImageWriter II, with a table of contents plus headers and footers displaying the date, page numbers, and any designated text. Keyboard commands let you view the full range of fonts to help you decide which one to use for printing. You can select outline spacing and text justification and specify that only one hierarchical level or subsection of an outline be printed. Files can be saved in ASCII and formats readable by *Microsoft Word, MacWrite, MacDraw,* and *Jazz*. You can easily swap outlines or parts of outlines between *More* files and between all Mac and IBM PC incarnations of *ThinkTank*. This compatibility is a boon for people who have *ThinkTank 512* and want to use templates or other files they've created.

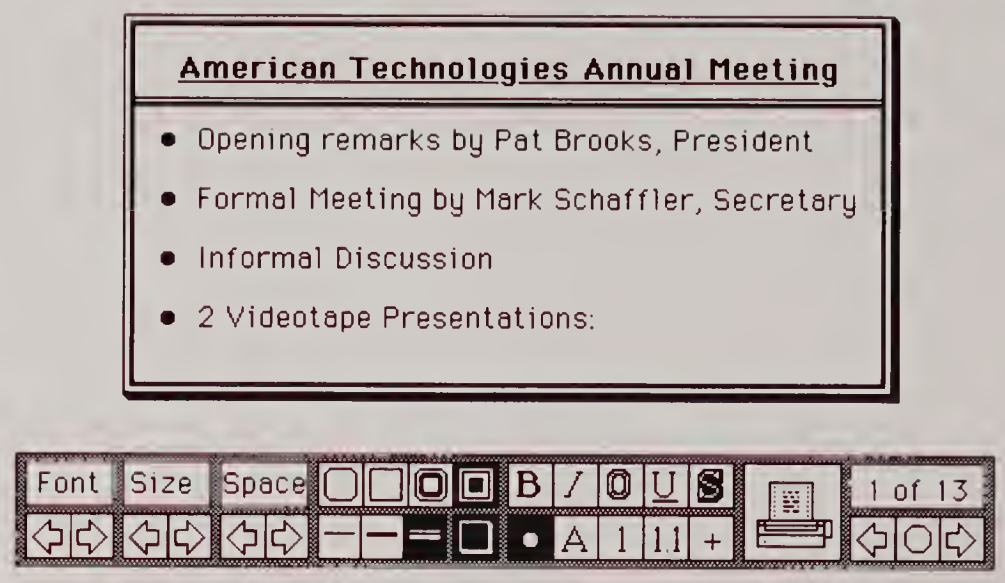


Figure 2
Bullet charts turn outlines into presentations automatically. By clicking on any of the options in the palette, you can instantly preview a different font size or style, spacing, or arrangement of decorative elements.

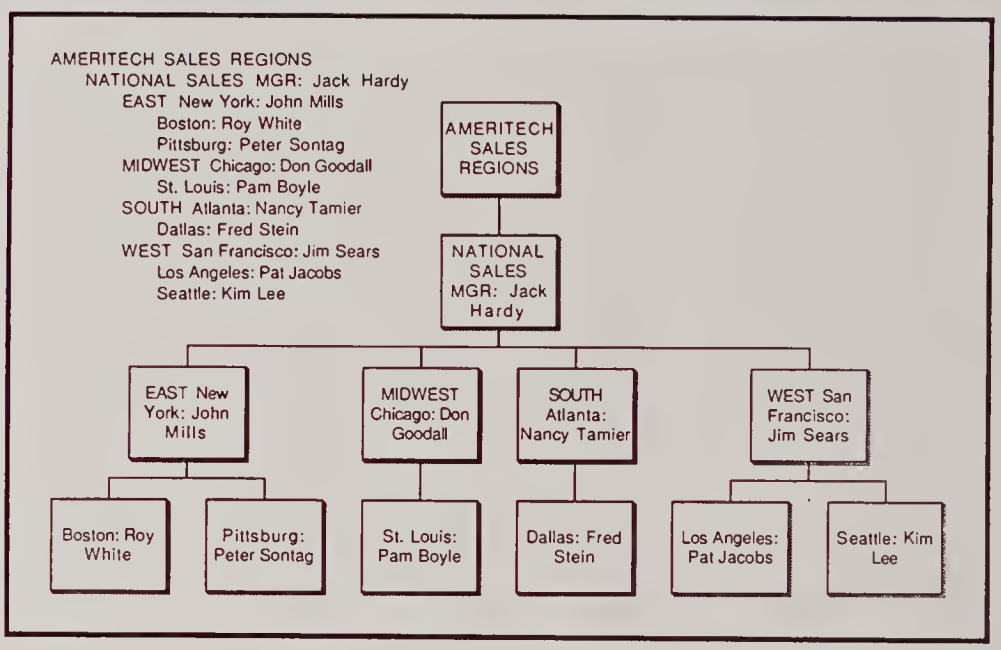


Figure 3
Tree charts can be created automatically from outlines simply by changing views. The hierarchical relationships of the outline (left) are graphically depicted in the tree chart (right).

Office Tools

More lets you call up five utilities and 11 preformatted templates while working with any outline. You can add the templates to outlines without cutting and pasting. A time-and-date-stamping facility lets you organize outlines by date and keep logs of meetings and phone calls. A calendar through the year 2039 generates appointment books covering any number of days with user-selected time intervals. A calculator adds up the figures in all subheads of a selected heading and is useful for simple applications such as compiling expense reports. If you use a modem, a phone dialer calls a number recorded anywhere in a selected headline. *More*'s templates cover routine record-keeping tasks such as address files, sales leads, order entries, travel expenses, and time billing. They can be added to an outline as is or be modified and saved. You can create your own template and install it in the Template menu.

More or Less

More is a clever and well-implemented but expensive multipurpose tool. If you're simply looking for an outline processor, consider sticking with *ThinkTank 512*—unless you can't live without multiple windows and *More*'s improved text processing abilities. However, if you juggle many projects during your workday and can take advantage of *More*'s presentation graphics, desk accessories, and templates, this jack-of-all-trades might easily become your office command post. □

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More
Living Videotext, Inc.
2432 Charleston Rd.
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Proficient Pagemaking

Richard Jantz

A pasteboard of time-saving tips and practical techniques for using PageMaker

So you joined the legion of desktop publishers. Armed with a Macintosh, the LaserWriter, and *PageMaker,* one of the popular page-makeup programs, you're willing to try whatever the job calls for: newsletters, reports, brochures, ads, marketing materials, magazines, books. As long as you don't run out of paper or cartridge toner, you're ready. . . .

Or are you? Just how adept are you at controlling your desktop publishing system? Have you mastered *PageMaker*'s sophisticated capabilities, or do you still squander hours trying to get page layouts just right?

This collection of tips will help you get the most out of *PageMaker* (see "Keyboard Shortcuts"). Whether you're a veteran or novice user, these tips turn pedestrian page navigation into streamlined sailing.

Ad-Lib Eraser You can produce a crude but functional "eraser" with the toolbox. Select the None and White options in the Lines and Shades menus, respectively. Then use the box or circle tool to draw an invisible object large enough to cover an unwanted page element.

Cut and Paste with Caution Cutting or copying with one tool and pasting with another can generate a file-corruption error. Don't mix the arrow and text tools during cut and paste operations.

Create Precision Art Augment *PageMaker*'s drawing abilities with *MacDraw,* which offers features such as curves, freehand shapes, and polygons; or *MacDraft,* which features precision-controlled drawing, object rotation, and scaling. Save *MacDraw*

Keyboard Shortcuts

Mouse click

Placing Documents

Place ⌘ D

Place text with original line breaks ⌘ with text icon

Stop text flow anywhere on page

Typing Text

Discretionary hyphen ⌘ –

Em dash Option Shift –

Page number marker Option Shift 3

Opening quotation mark Option [

Closing quotation mark Option [

Single opening quotation mark Option Shift]

Apostrophe Option Shift]

Selecting Text

Line

Paragraph ⌘

Text block ⌘

Word

Changing Views

Actual size ⌘ A

Fit in window ⌘ F

Go to "Actual Size" from other view ⌘ at new center

Go to "Fit in window" from "Actual Size" ⌘

Go to "200% Size" from any view ⌘ Option at new center

Changing Graphics

Resize proportionally Shift while dragging

Return a "placed" graphic to original proportions Shift handle

Change a rectangle to a square Shift handle

Change an oval to a circle Shift handle

Using Tools

Show/hide guides ⌘ G

Show/hide rulers ⌘ R

Show/hide toolbox ⌘ W

Use grabber hand Option while dragging

The mouse and keyboard shortcuts in this list provide quick operation and some special functions.

graphics in PICT format, and place *MacDraft* drawings into *PageMaker* via the Clipboard or the Scrapbook or by turning them into *MacPaint* files.

Condense and Stretch Type You can use *MacDraw* in conjunction with *PageMaker* to embellish type. Type the text into *MacDraw* in a laser font and save the file in PICT format. Open *PageMaker* and place the *MacDraw* file. Eight handles surround the type; drag one in any direction to stretch or compress the type (see Figure 1).

Save Unplaced Text Avoid the loss of unplaced text when you close a file in the middle of a layout. Click the plus (+) handle at the bottom of the unfinished text block and place the remaining text on the pasteboard instead of the publication window before saving the file.

Form-Fitting Headlines Sometimes it's difficult to fit a long headline or a logo that spans multiple columns at the top of a page. Keep in mind that line length is determined by where you click the text insertion point. Inside the publication window, new text must conform to the column guides; therefore, type large text or headlines on the pasteboard and then drag them into place on the page.

Tighten Up Big Heads Because *PageMaker* lacks automatic or manual kerning features, it's difficult to tighten up large headlines. Although this method is imprecise, the program's text editor can divide a major headline into separate text blocks at points where you want kerning. For example, a large headline like "Winston Wins" might consist of three

separate text blocks: "W," "inston W," and "ins." Use Actual size or 200 percent to position each text block.

Save Disk Space Customize *PageMaker* backup disks to gain as much free space as possible and avoid swapping disks. Remove the Quicktour, Quicktour Text & Graphics, and Help Screens folders. Also remove either the ImageWriter and Aldus Prep folders or the LaserWriter folder, depending on which system you intend to use. Finally, remove any unneeded fonts or desk accessories from the System Folder with the Font/DA Mover.

Creating Em and En Spaces Create alternative spaces with special keyboard commands. Make an em space by pressing Option-Shift-hyphen. Make an en space with Option-hyphen.

Zoom with Precision You may lose track of your page position when you focus in on a layout's detail by selecting the 200 percent Page option. Keep your bearings by holding down both the ⌘ and Option keys, then click with the arrow at the point you wish to zoom in on.

Switch to the Fast Lane Use *Switcher* to move quickly and easily between programs such as *MacWrite, Microsoft Word, MacPaint,* and *MacDraw*—as long as your Macintosh has enough memory. Although 512K is recommended, you can allot 256K to a customized *PageMaker* disk that contains only essential files. The amount of memory remaining dictates how many other programs you can install. Two megabytes of RAM give you room to create an integrated desktop publishing system: load *PageMaker* along with design programs, a picture library or a clip art manager, a word processor, and digitizing software.

Diagonal Scrolling Scroll diagonally or in any direction by holding down the Option key while dragging the mouse. This is often more efficient than the scroll bars because it lets you move directly to a new page position with the tool known as the *grabber hand.*

Smooth Those Jaggies Bit-mapped graphics, like those produced by *MacPaint,* are slightly distorted when printed on a LaserWriter. For best results, both printer and graphics should have the same resolution; however, a LaserWriter (300 dots per inch) has more than four times the resolution of bit-mapped graphics (72 dots per inch). To enable the printer to fill in the jagged edges, use the Print dialog box to select the Smooth option. Then reduce the Scaling to 96 percent to enable the printer to add dots and produce an exact multiple of the bit-mapped resolution.

Bleeding Graphics Normally, you can't print graphics or text that extends, or "bleeds," to the page's outside edges on the LaserWriter. This holds true even

Figure 1
Use PageMaker *with* MacDraw *to stretch or condense type—a technique that adds flair to headlines and initial capitals.*

after setting up 0.00-inch margins or trying to print an enlargement, because the LaserWriter automatically creates a ¾-inch border. However, you can create bleed effects on the top and bottom of letter-sized pages by printing on longer paper than you want for the final publication and trimming off the excess with the following procedure.

- Open a new file, choose Page Setup from the File menu, and select U.S. legal paper (8½ by 14 inches) in the dialog box. Use *PageMaker*'s default margin settings.
- Choose Actual size from the Page menu and drag two horizontal ruler guides to mark off 11 inches. Add dotted lines to provide a guide for trimming the excess paper off the printout.
- During the layout process, let the text and graphic elements you want to bleed overlap the top and bottom edges of the 11-inch document (delineated by the ruler guides). If you wish to shorten text blocks that extend too far over the dotted line, select and drag the bottom plus (+) handle upward.
- Print the final copy on legal-sized paper and cut off the excess. □

Richard Jantz, based in Berkeley, California, is a freelance writer and the principal author of Creating the Best Impression: All about Business Graphics Software *(Hayden Book Company, 1986).*

PageMaker, version 1.0
Aldus Corp.
411 Second Ave. S
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List price: $495

Four Secrets of Excel

Danny Goodman

Learn how to make your spreadsheets sizzle with four efficient techniques for linking, opening, printing, and moving within spreadsheets

Anyone can be an accomplished *Excel* user and still be unable to come up with what should be simple solutions. One problem that crops up frequently concerns *Excel*'s spreadsheet-linking abilities, particularly in relation to updating external references to nonresident worksheets. I'll explain how to smooth these linking operations while demonstrating how to

- set up multiple-document *Excel* systems you can open as a single document from the Finder or from within *Excel* (for example, a system containing a worksheet, a macro sheet, and graphs)
- create a "living" table of contents for a large worksheet
- print irregularly shaped (nonrectangular) worksheets without printing all the blank pages in between.

Secret #1: Linking Spreadsheets

Linking *Excel* worksheets is a real asset in many business situations. Linking lets you consolidate information from several worksheets into a summary worksheet. In a budget forecast, for instance, you can combine expense figures forecast by each department head to determine the company's total cash requirements.

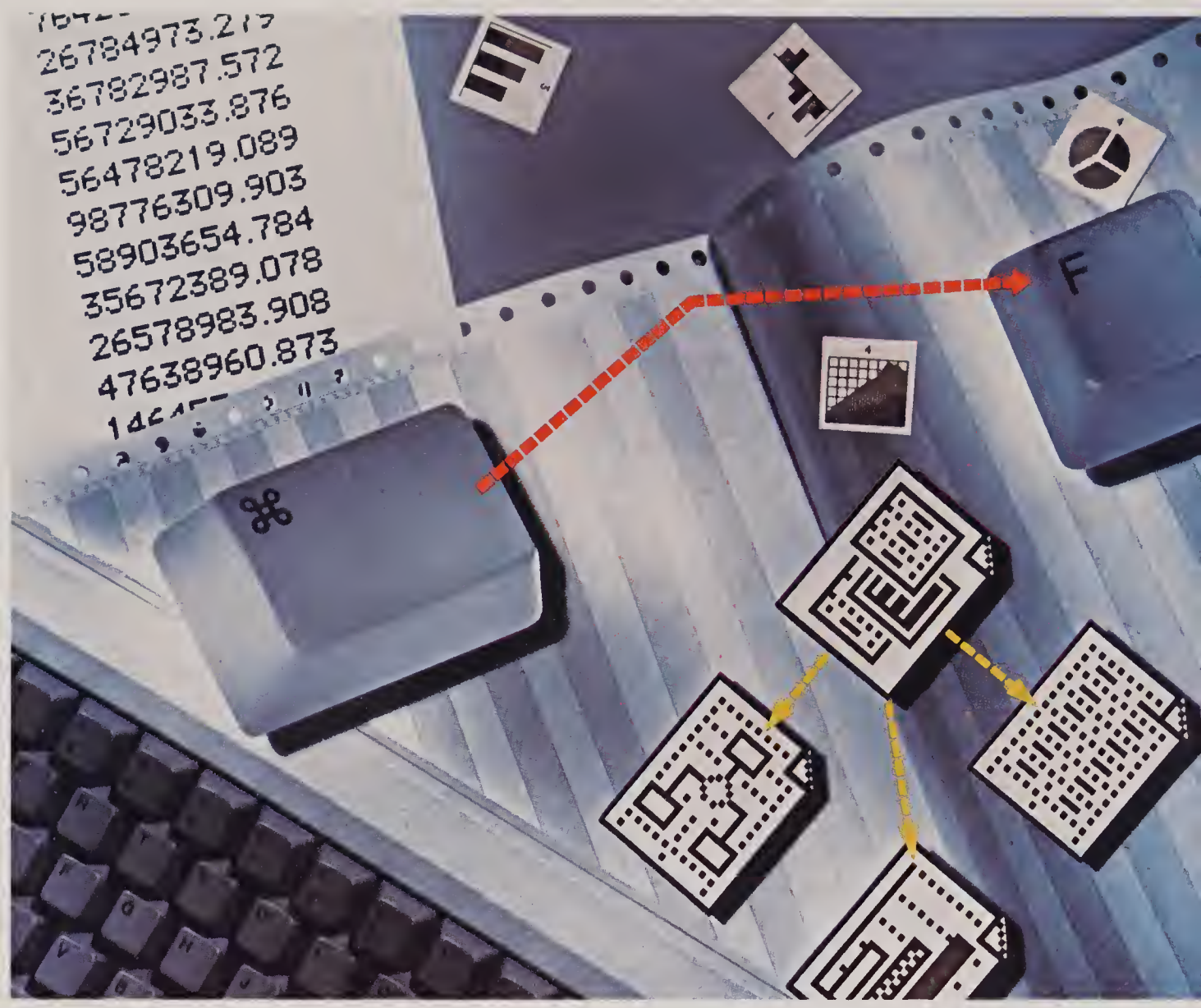
In *Excel* parlance, the department worksheets are called *supporting* documents. The summary worksheet is called a *dependent* document because it contains formulas that retrieve values directly from one or more supporting documents. When you open a summary worksheet, its formulas seek information from supporting documents named in those formulas, even if the supporting documents are not open at the time. Whether or not you can retrieve values from closed documents, however, depends on the way the formulas are constructed.

Simple versus Complex

Excel can retrieve values in closed supporting documents if the formulas in the summary worksheet contain "simple external references" but not if they contain "complex external references." A simple reference refers to a specific cell or range of cells in a supporting document. This can be an absolute cell or range reference, such as "Department1!$C$14," or a range name, such as "Department1!January_Total."

A simple reference must also refer to only one such cell or range name in a formula at a time. Consequently, you can't add, subtract, or perform any function on two or more external references within a formula without creating a complex reference. The formula "=Department1!$C$14 + Department1!$C$15" is a complex external reference.

Once opened, a summary worksheet attempts to update the supporting documents. If they're closed, a dialog box asks whether you wish to update references to nonresident (that is, not open, or not resident in memory) worksheets. The updating process will be successful if the formulas linking the summary worksheet to



MARK FARBIN

the dependent documents contain only simple references, but not if complex references are used. So much for theory. Let's look at some examples.

The Problem

Figure 1 illustrates two simple supporting worksheets that list sales, expenses, and profits for each month of the first calendar quarter. Figure 2 shows two different methods of referencing external cells after *Excel* has attempted to update those references without opening the supporting documents. Notice the #REF! error message in cell B19. This message indicates that *Excel* had trouble with the reference in the formula. That formula, "=sheet1!$B$3+sheet2!$B$3," attempted to add the January sales figures from two nonresident worksheets, making it a complex external reference (see Figure 3). This formula would work only if the two supporting documents and the summary document are open simultaneously.

The Solution

The second method solves this problem by using formulas containing only simple references, namely, "=sheet1!$B$3" in cell B10 and "=sheet2!$B$3" in cell B14. Each formula refers to a specific absolute reference cell in one external sheet. With the simple references working fine on the summary worksheet, you can go ahead and use the imported values in the summary sheet's own calculations. Therefore, in cell B4, the formula "=B10+B14" adds the values fetched by *Excel* in cells B10 and B14.

The formulas referring to nonresident worksheets must be either absolute references (indicated by dollar signs on both sides of the cell references) or range names. A relative reference in the formula (for example, "=sheet1!B3") would make this a complex reference. Therefore, if you think you might rearrange cell locations on a supporting worksheet, you should define as many cells as possible with range names (using the Define Name choice on the Formula menu) and refer to cells by name rather than by cell number. Since *Excel* considers a reference to a nonresident worksheet's range name to be a simple reference, you won't lose track of supporting cells as you adjust the supporting document's layout.

Saving Memory

All of the foregoing have a significant impact on the way you organize your linked worksheets and use memory. Complex references, as it turns out, allow you to accomplish much more on the summary worksheet with as few cells as possible—you can perform calculations that refer directly to external cells. Your summary document, therefore, will be compact, but all supporting documents must be open at the same time.

If you use simple references, however, you must essentially replicate the data cells from the nonresident sheets on the summary sheets to perform calculations on those values. While this may require a large summary sheet, it still may be more parsimonious with memory than using complex references, because you need only the extra room on the summary worksheet for the raw values. Since you'll likely be totaling or performing other calculations on the data, you don't need to import the totals from the nonresident sheets. Therefore, by using simple external references, you may very well use less total memory to achieve the same results of linking the data.

(continues)

Secret #2: Documents Unite!

Creating macros that work independently of specific worksheets lets you reuse the same macro in a number of situations. However, you must remember to open the macro sheet along with the worksheet. You can usually open several documents from the desktop at once by Shift-clicking each document and choosing Open from the File menu. Opening linked documents can be problematic because you must open them in a specific order. Otherwise, you risk having the dialog box ask if you want to update data from nonresident worksheets; you're only allowed to open a single document.

sheet1

	A	B	C	D	E
1		DEPARTMENT 1			
2		January	February	March	Q1 Total
3	Sales	1000	2000	2500	5500
4	Expenses	200	600	1000	1800
5	Net Profit	800	1400	1500	3700
6					

sheet2

	A	B	C	D	E
1		DEPARTMENT 2			
2		January	February	March	Q1 Total
3	Sales	300	500	1200	2000
4	Expenses	100	750	500	1350
5	Net Profit	200	-250	700	650

Figure 1
With department profit figures used as supporting documents, and the same spreadsheet layout for each department, values can be easily linked to a dependent document (see Figure 2).

The Resume Excel Icon

Built into *Excel,* however, is a clever device that you may have overlooked—the Resume Excel icon. Whenever you quit *Excel,* the program records the windows open at that instant and saves the record as the Resume Excel icon. Later, you can open the icon from the desktop and return to the combination of documents you quit earlier.

You can rename the Resume Excel icon to save specific sets of documents. You can create as many sets as you like by saving the Resume Excel icons under different names, and you can use the same document in different sets.

Getting Links in Order

Be careful when your Resume Excel documents contain linked worksheets; make sure the documents are opened in order. Open supporting documents first, followed by dependent (summary) documents. Otherwise, the process will be curtailed by the dialog box that asks whether you want to update with data from nonresident worksheets.

The Resume Excel icon first opens the document whose window was on top of the stack when you quit. If the summary worksheet is on top, you'll have to "bury" its window before you quit. Choosing ⌘-m quickly places the topmost window at the bottom of the stack. Conversely, Shift-⌘-m brings a buried window to the top.

Secret #3: Spreadsheet Rapid Transit

Large worksheets usually consist of several small, distinct areas that are interrelated. A construction proposal, for example, might contain several subsections for calculating estimated cost and schedule details. The information in the subsections provides backup material for another subsection—a one-page summary contained elsewhere on the worksheet.

Large worksheets present two difficulties: moving between subsections is slow; and when you do move, it's easy to lose your bearings. By creating a simple macro, you can point to any cell in the summary sheet and issue a keyboard command, and you'll be moved directly to the related backup material on the worksheet. A second macro returns you to the summary page. Figure 4 shows a worksheet with a summary page that represents a 1040 tax form. In another section of the worksheet, several backup forms represent different tax schedules.

The Reference Section

To make a single macro work regardless of the cell you select, you must create a new section in the worksheet, such as the area called "Replica" in Figure 4. This section, located 100 rows below the 1040 form, holds the references to the

sheet3

	A	B	C	D	E
1			SUMMARY		
2					
3		January	February	March	Q1 Total
4	Sales	1300	2500	3700	7500
5	Expenses	300	1350	1500	3150
6	Net Profit	1000	1150	2200	4350
7					
8					
9	Simple				
10	From	1000	2000	2500	
11	Sheet 1	200	600	1000	
12					
13					
14	From	300	500	1200	
15	Sheet 2	100	750	500	
16					
17					
18	Complex:				
19	From Both	#REF!			

Figure 2
A dependent document can retrieve information from nonresident supporting documents when the references to those unopened documents are simple references. A complex reference generates a #REF! error, as shown in cell B19.

sheet3

	A	B	C	D	E
1			SUMMARY		
2					
3		January	February	March	Q1 Total
4	Sales	=B10+B14	=C10+C14	=D10+D14	=SUM(B4:D4)
5	Expenses	=B11+B15	=C11+C15	=D11+D15	=SUM(B5:D5)
6	Net Profit	=B4-B5	=C4-C5	=D4-D5	=SUM(B6:D6)
7	-	-	-	-	-
8					
9	Simple:				
10	From	=sheet1!$B$3	=sheet1!$C$3	=sheet1!$D$3	
11	Sheet 1	=sheet1!$B$4	=sheet1!$C$4	=sheet1!$D$4	
12					
13					
14	From	=sheet2!$B$3	=sheet2!$C$3	=sheet2!$D$3	
15	Sheet 2	=sheet2!$B$4	=sheet2!$C$4	=sheet2!$D$4	
16					
17					
18	Complex:				
19	From Both	=sheet1!$B$3+sheet2!$B$3			

Figure 3
A simple external reference fetches data from only one nonresident cell. Math operations can then be performed on that data, as shown in B4:E6. The formula in cell B19 attempts to retrieve data from two external cells at once. Both supporting documents must be open for the summary sheet to "see" this data.

names of the backup forms. After placing the *Excel* cell pointer on a cell containing the amount extracted from a supporting form, choose Option-⌘-f (or another keyboard equivalent you've specified), and the short macro will look in the cell in the same column, 100 rows down, where it will find the name of the desired schedule's cell range. The formula immediately scrolls to that schedule. Pressing Option-⌘-x initiates the second macro, restoring the view of Form 1040.

Creating the Macro

The macro listings are shown in Figure 5. To create the macros, perform the following operations:

1. Choose New from the *Excel* File menu.
2. In the resulting dialog box, click the macro sheet button and OK.
3. Type in the listings on the macro sheet just as they are shown in Figure 5. Pay particular attention to location of parentheses.
4. Select cell A1 on the macro sheet and choose Define Name from the Format menu.
5. The name of the macro ("jump") will already appear in the Define Name dialog box. Click on the button to the left of the word *Command*. This will activate the small text box in the lower-right corner of the dialog box.
6. Press the Tab key twice to advance the text pointer to that small box, and type the letter you wish to use as a keyboard macro ⌘ equivalent. Then click OK.
7. Select cell A5 on the macro sheet, and choose Define Name from the Format menu.
8. As in step 5, click on the ⌘ button.
9. Tab the text pointer to the small text box and type any lowercase letter as a keyboard command to return to the main form. Then click OK.
10. Choose Save As from the File menu and assign an easily recognizable name to this macro sheet (if you're using HFS, save the macro in the same folder as the worksheet).

In the 1040 form you can add more cells linked to other worksheet areas without revising the macro. Simply type the range name of the supporting worksheet area into a cell 100 rows below its value on the 1040 form.

You can also use this macro to create a table of contents for an *Excel* document that is divided by pages. After listing the page titles and page numbers as they might appear in a book's table of contents, select the cell containing the page number and issue the macro, and *Excel* will bring that page to the screen in an instant.

If you are creating an *Excel* environment for inexperienced users, you might want the macro to summon instructions for particular entry cells. When unsure about the kind of data to put in a cell, the user could issue the macro, which would then shift the view to a context-sensitive help screen from elsewhere on the worksheet.

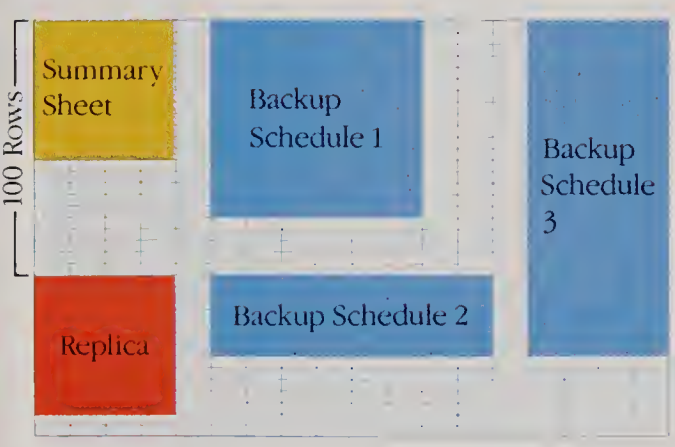


Figure 4
In a large worksheet, a summary sheet area may rely on values calculated in several supporting subsections on the sheet. The cell range for each form is defined with a recognizable name, such as "SchedB." By placing the range names of the backup areas in the Replica area, a simple macro zips the desired backup area into view.

Secret #4: Print No Blanks

As the previous document demonstrates, *Excel* worksheets (or interesting areas thereof) can grow to nonrectangular proportions. When you print large worksheets, however, you may often produce blank or unnecessary pages that make the document unwieldy and difficult to read. This problem is caused by blank areas of the spreadsheet and areas used for calculation that are unnecessary for the final report.

The good news is that *Excel* lets you bypass the pages you don't want to print, even if the resulting print area is oddly shaped. Print areas must be contiguous, and you cannot specify more than one print area at a time.

Selecting a Print Area

Selecting a nonrectangular print area is easy. Simply choose contiguous rectangles while holding down the ⌘ key until you build up the shape you want.

When you have marked the area, release the ⌘ key, pull down the Options menu, and choose Set Print Area. This action creates a named range on your worksheet called Print_Area just as if you had selected those cells and named them yourself with the Define Name menu command. In fact, if you choose Define Name from the Format menu, you will see that the Print_Area range has been named for you automatically.

Now when you print, only the areas selected and assigned to Print_Area will be printed. Later, if you want to print a different section, select the appropriate cells on the worksheet and choose Set Print Area again. But if you want to print the entire worksheet, then be sure to delete Print_Area from the Define Name dialog box.

These four tips should keep you going for a while. Try them in your *Excel* work, and let us know how you're doing. □

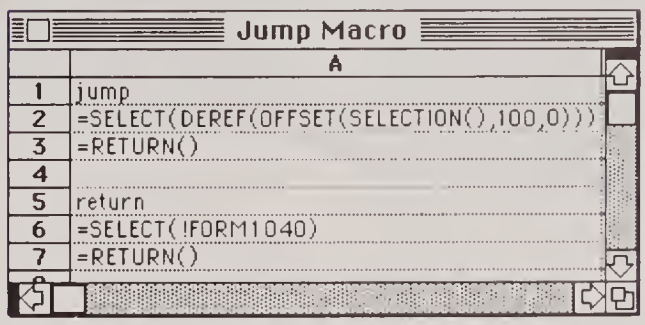


Figure 5
The top macro, "jump," looks for the name of the desired backup area in a cell 100 rows below the location of the cell cursor. Return always returns the view to the summary sheet.

Danny Goodman is a Contributing Editor to Macworld *and author of* Hands-On Excel *(1986; Scott, Foresman & Co.).*

Excel
Microsoft Corp.
16011 N.E. 36th Way
Redmond, WA 98052
206/882-8080
List price: $395

The Macintosh tackles the final frontier at Martin Marietta, where engineers are using it to design the space station and shuttle. Pictured is Gerry Simonson at the company's Denver Aerospace Facility.

Desktop Engineering

Paul Freiberger and Dan McNeill

The Macintosh is helping design the space station. It started when an engineer at Martin Marietta took a Lisa computer to work. Others liked it, and soon the company ordered more. When the Macintosh appeared, project managers began supplying them to engineers' desks in bulk.

The story is typical. Over the last few years, thousands of Macintoshes have quietly filtered into the engineering departments of companies like Hughes Aircraft and McDonnell Douglas. And for every one of those, there are probably ten more in smaller environments.

While administrators have tended to favor IBM, the Macintosh has won acceptance mainly from the engineers themselves. "Many corporations say they swear by IBM, but what you see when you walk in are Macs," says Marvin Kreithen of Bridgeport Machines. Apple intends to promote desktop engineering—primarily in the area of CAD (computer-aided design)—much as it previously pushed the concept of desktop publishing. This commitment greatly heartened third-party developers, and several first-rate Macintosh CAD programs are already available.

The Macintosh Edge

The Macintosh is a newcomer in the engineering design and drafting domain, but it has some distinct advantages. One is price. The least expensive Apollo workstation now costs around $9000. An IBM PC AT with an enhanced graphics board and an enhanced monitor sells for about $4500, and *AutoCAD,* the reigning prince of IBM PC CAD software, ranges from $1000 to $2500. A Macintosh with a second disk drive sells for around $2495, and CAD programs cost between $400 and $2495—bringing the price of a Mac design station to no more than $4990.

Another advantage is the Macintosh user interface, which allows engineers new to the Mac to start working in a few hours and become fluent in two weeks. You need days of training to use *AutoCAD* and weeks or months to become fluent.

A third Macintosh advantage is that it lets you move designs easily from program to program at different stages of a project. For instance, you could easily shift a CAD drawing via the Clipboard to *MacPaint* for touching up, then transfer the drawing to *PageMaker* and print a high-quality technical document.

CAD Fundamentals

Creating, editing, transmitting, and storing drawings are completely electronic processes with CAD. CAD programs give you instant erasure and numerous special aids for structured drawing. For creating designs with specific lengths, widths, and depths, most CAD programs display a grid and automatically calculate and draw tangents, fillets, circles, perpendiculars, and different views of an object. They also have multiple layers, which you display as you choose.

For adding cross-hatching and labels, most programs offer several fonts and fill patterns, as well as automatic dimensioning. This last feature is essential because manually calculating height and width outside a drawn item is such a time-consuming process.

Lower-level programs like *MacDraw* and *MacDraft* are relatively inexpensive and can help conceptualize floor plans and machine parts. But they don't offer multilayering, perspective views, or rotation from one plane to another, nor do they support large plotters. Programs like *Mac3D, Easy3D,* and *MacSpace* let you draw and manipulate objects in three-dimensional space (see "3-D In Depth," *Macworld,* June 1986), but they lack the features needed to solve sophisticated engineering problems.

PHOTOGRAPHS BY GEORGE STEINMETZ

The New CAD Programs

Among Macintosh CAD programs, *EZ-Draft* and *Professional CAD for the Mac* appeal to mechanical engineers, who need a rather rigid format; *Dimension* appeals to designers and architects, who like the numerous fonts and fills, the ability to stretch circles and squares on the screen, and the greater freehand capacity.

Bridgeport Machines' *EZ-Draft,* the first of the Macintosh CAD packages, permits six views of an object—top, bottom, and four sides—and lets you project from one to another. With what Bridgeport calls *dynamic dimensioning* you create dimensions with or without tolerancing data and move and edit the dimensions easily. *EZ-Draft* has 256 layers, an IGES (International Graphics Exchange Standard) interface for communicating with mainframes, a macro capacity, and good documentation. An upgrade, which at press time was slated for release in mid-August, includes an Undo command, fonts and fillets for architects, and a tenfold increase in speed. *EZ-Draft* was originally ported from VAX and Apollo machines; future releases will follow the Macintosh user interface more closely. Bridgeport is also developing a translator that allows *EZ-Draft* to read *AutoCAD* files.

EZ-Draft is clearly the most complete CAD program available on the Macintosh, but the new version will require 1 megabyte of RAM and cost $2495.

Professional CAD for the Mac, from Micro CAD/CAM, is a smaller, less expensive package that fits onto a single 400K disk and sells for $800. Like *EZ-Draft, Professional CAD* addresses mainly mechanical engineers and has good preliminary notices. The program offers 40 layers, mirroring, adjustable grids, splines, and an interface to most plotters. *Professional CAD* also works with the company's CAM software. To fit *Professional CAD* onto a 400K disk and get the program to run efficiently on a 512K Mac, Micro CAD/CAM had to sacrifice 3-D capability, an Undo command, and a macro language. However, *Professional CAD* sells for a third of the price of, runs faster than, and follows the Mac user interface better than *EZ-Draft.* Future plans for the product include 3-D projection, an IGES interface, and additional architectural fills.

Glowing globes created in Visual Information's Dimension *via ray tracing and displayed on the VMI Intelligent Monitor.*

Dimension, a $750 program from Visual Information, specializes in conceptual design. The program lets you create surface-sculptured solid models and is the first Macintosh CAD program with a true 3-D database. *Dimension* rotates the perspective and manipulates up to 16 simultaneous views; the program includes mirroring, infinite nested groups, and color options. *Dimension* should appeal mainly to architects, engineers, and others preparing technical documents. Ideally, *Dimension* should let you move designs to 2-D programs to create more precise renderings. To that end, Visual Information is working with 2-D program developers so that files can be exchanged.

Minicad, from Diehl Graphsoft, began as a one-person project at the Johns Hopkins Applied Physics Lab. After several incarnations, it became a two-dimensional CAD system with a three-dimensional designer. Objects can transfer freely between the 2-D and 3-D modules, with no size restriction. The 2-D portion is *MacDraw*-like but with higher precision, 15 layers, and color capacity. And the program formats for standard A, B, C, D, E, and F plotter sheets. However, the $395 *Minicad* still lacks a macro language and fill capacity and doesn't yet support IGES.

Professor William R. Dale at Cal Poly, Pomona. Cal Poly's computer-aided design program is one of the largest in the country, with over 1200 architecture, landscape architecture, and planning students.

Templates

Like *MacPaint,* CAD programs can be supplemented by templates—clip-art-like drawings that plug right into a design. Architects, for instance, require illustrations of items such as gates, doors, windows, and trees. The number of templates available for a CAD program can greatly affect its value. *AutoCAD* on the IBM PC is no longer the most efficient CAD software around, but it benefits greatly from the number of templates written for it. This fall CompServCo expects to introduce one architectural and two engineering templates for both *EZ-Draft* and *Professional CAD for the Mac.* The company already offers *MacCAD,* a collection of 12 libraries of three to four disks each for *MacDraw* and *MacDraft.*

Specialty Software

A great variety of specialty programs are also available. For example, SolarSoft offers *Sunpas* to help engineers and architects calculate indoor temperatures for buildings. A different kind of specialty program aids printed circuit board (PCB) designers. Vamp sells *McCAD,* a series of sophisticated integrated CAD modules that automates the PCB design-and-analysis process. *McCAD* modules are currently in use at companies like Hughes, Motorola, and RCA. Bishop Graphics' *Quik Circuit* helps engineers to create products efficiently for the Macintosh itself. With this program Micrographic Images designed and laid out its first 1-megabyte upgrade board in a day and a half.

Two more specialty programs deserve mention here: *DesignScope,* from BrainPower, allows an engineer to take a block diagram, assign parameters, and run a simulation to see if the design works; *FrameMac* is a structural engineering package that Erez Anzel distributes for designing and analyzing two-dimensional frames or trusses with any number of nodes and prismatic elements. Anzel also developed *Beamac II,* a program for analyzing and designing continuous (indeterminate, multispan) or simply supported beams.

Configurations of Macintosh CAD

The Macintosh is most often used for CAD in conjunction with other computers. In the space station program at Martin Marietta, where some engineers have IBM PCs, Centram's *TOPS* network connects all the computers. However, the Mac generally links to larger machines, either as a complement or as a terminal.

Given the cost of minicomputer workstations, companies often buy Macs for simple work and reserve their minis for more complex tasks. Other companies tie the Mac, as a terminal, to a larger system. At Alcoa's Technical Center near Pittsburgh, Macs act as VT-100 and Tektronics graphics terminals for engineers seeking to improve metalworking processes.

Academia is also advancing the idea of connecting the Mac to other computer systems. At the University of Michigan, the MacApollo Project is developing a distributed computing environment to serve more than 6000 students and teachers. The project has already achieved its first milestone: an RS-232 connection between a Mac and an Apollo. This product is available in the public domain through the Apollo Domain Users Society. Eventually the MacApollo Project should connect several Macs on a network to a gateway for an Apollo network.

The Mac's Future

The Macintosh is not yet the dream machine for desktop engineering, but it's making headway. For designers who prefer a larger CRT, the MegaScreen, from Micrographic Images, offers 1024- by 921-pixel resolution and increases the Mac's display size by four to six times. MegaScreen currently works with most CAD programs, with the major exception of *EZ-Draft.*

Colors make the layers of a complex drawing much more distinct, a real plus for applications such as floor plans and topographical maps. Fortunately, a full-color, 640- by 480-pixel screen is available for the Mac from Vermont Microsystems. The company also makes "smart" boards for its monitors that convert CAD specifications to screen images displaying up to 256 colors at once, out of a palette of 250,000. However, programs must be written specifically for these boards; thus far, only *EZ-Draft* and *Dimension* work with them. The monitors retail at $2195 for the 13-inch model and $4495 for the 19-inch model. When Apple comes out with its new Macintosh next year, the Vermont Microsystems graphics boards should plug right in.

Since CAD programs perform many calculations over and over, a 68881 floating-point coprocessor, which handles over 40 complex mathematical functions, speeds up the design process considerably. Four upgrades substantially increase the Mac's processing power: Novy Systems' Floating Point Accelerator; Quesse Computer's Maccelerator; the HyperDrive 2000, from General Computer; and the Levco Prodigy 4. All four boards supply the Mac with a floating-point coprocessor; in addition, the Levco and General Computer products replace the Mac's 68000 processor with

VAMP's George Soluk waits while a plotter rolls out a printed circuit design created in McCAD.

A Sampling of CAD Products for the Mac

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List price: $750, Dimension/Color $1250, solid shading add-on module $995

Easy3D
Enabling Technologies, Inc.
312/427-0408
List price: $99

EZ-Draft
Bridgeport Machines
215/659-5055
List price: $2495, $1995 limited-time introductory offer

Floating Point Accelerator
Novy Systems Inc.
904/427-2358
List price: $449

Frame-Mac, Beamac II
Erez Anzel
212/884-5798
List price: Frame-Mac $495, Beamac II $295

HyperDrive 2000
General Computer Corp.
800/422-0101, 617/492-5500
List price: $3195

Intelligent Monitor
Vermont Microsystems, Inc.
800/354-0055, 802/655-3800 in Vermont
List price: 13-inch $2195, 19-inch $4495

MacCAD
CompServCo
800/272-5533, 504/649-0484
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Quesse Computer Co., Inc.
206/392-7701
List price: $495, $995 bundled with the Consulair Direct Access C Compiler and installation kit

MacDraft
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List price: $239

MacDraw
Apple Computer, Inc.
408/996-1010
List price: $195

MacSpace
Abvent
213/659-5157
List price: $395

McCAD
Vamp Inc.
213/466-5533
List price: $395 to $595 per module

McNET
Argus Software
617/475-8952
List price: $250, Components Library Builder $100, demo disk $50

MegaScreen
Micrographic Images Corp.
818/407-0571
List price: $2995, without monitor $1495

Minicad
Diehl Graphsoft
301/461-9488
List price: $395

Prodigy 4
Levco
619/457-2011
List price: $7000

Professional CAD for the Mac
Micro CAD/CAM Inc.
213/838-7851
List price: $800

Quik Circuit
Bishop Graphics CAD Systems Corp.
818/991-2600
List price: $695, $15 for demo disk

Sunpas
SolarSoft, a division of Kinetic Software, Inc.
415/342-3338
List price: $189

a faster chip. (For a thorough discussion of these upgrades see "New Ways to a Faster Mac," *Macworld,* August 1986.)

Many observers think Apple's next Mac or Mac-like machine will feature a 68020 CPU and a 68881 coprocessor. It may also have UNIX, which has become a standard in the technical world. Such a computer would spread the CAD revolution even further and faster. To that end, Apple recently acquired rights to Cadmus Computer Systems' proprietary software, which is based on a UNIX workstation that runs on the 68020 microprocessor and has the graphics user interface of the Macintosh and a distributed file system for Macs and IBM PCs.

But even without such a super-CAD device, the Macintosh is well poised to shape the contours of desktop engineering and perhaps become one of engineers' premier machines. □

Paul Freiberger and Dan McNeill are coauthors of Computer Sense *(Bantam, 1986) and other books and contributors to* MacOffice *(Compute! Publications, 1985).*

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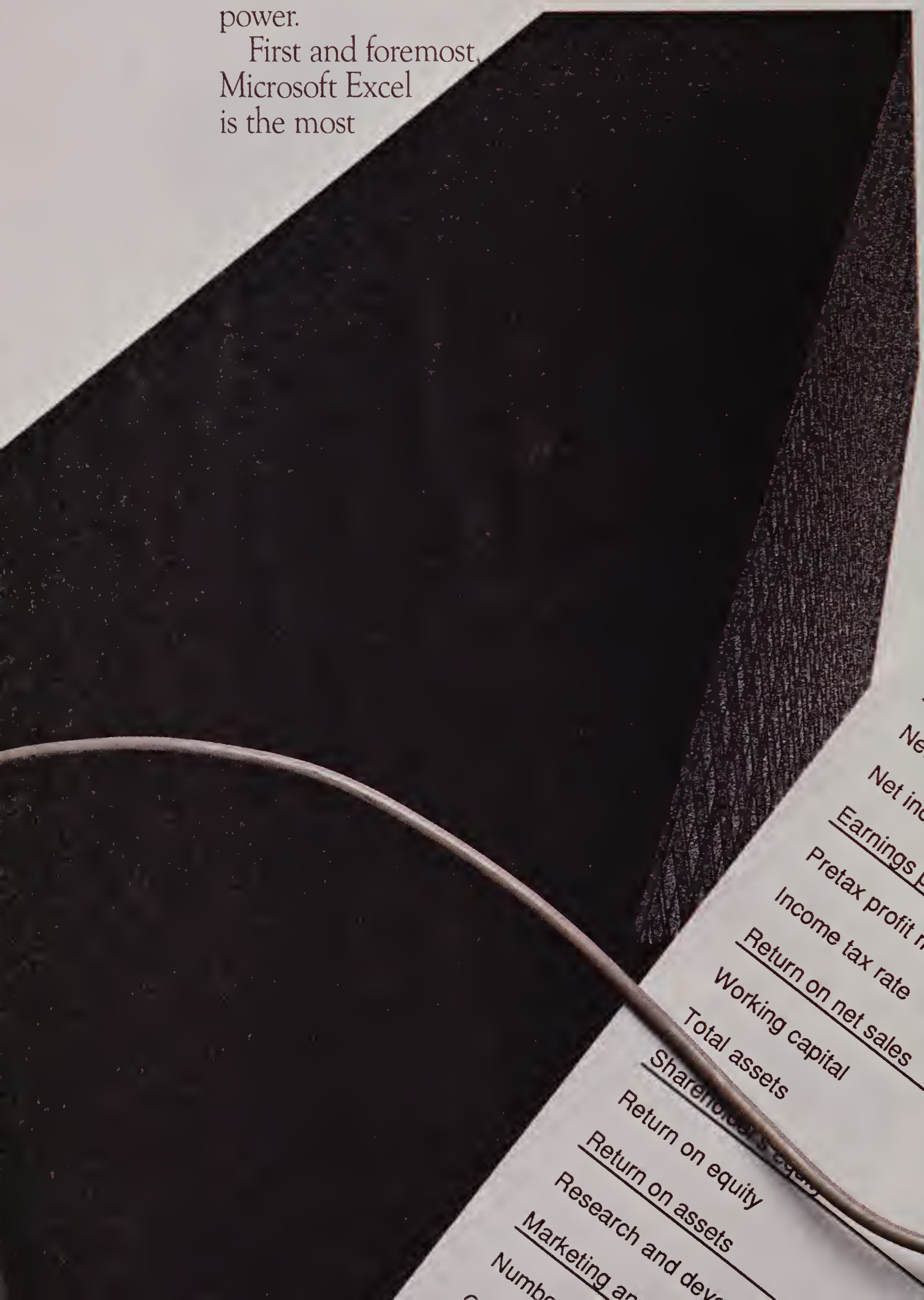

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Macware Reviews

ComicWorks, Record Holder, FullPaint, MaxThink, KidsTime, Uninvited, MacKeymeleon, MacInker, and Orbiter

Edited by Erfert Nielson

Comic Relief

Considering the levity of the Sunday comics, it's sometimes difficult to appreciate the amount of work that goes into them. But as anyone who has ever drawn a comic strip knows, cartooning is a labor-intensive art. ***ComicWorks*** promises some relief from the drudgery of creating repetitive panels by providing a cartoonist's wish list of features specifically geared to producing comic strips and comic books. *Macworld* examined a prerelease version of this exciting new program, which was developed by MacroMind and published by Mindscape.

ComicWorks combines the capabilities of bit-mapped programs like *MacPaint* with the object-oriented approach of programs like *MacDraw*. If you're not a cartoonist, *ComicWorks* doubles as a limited desktop publishing program, allowing for the easy integration of text and art in greeting cards, short newsletters, and flyers.

MARK ULRICH

A Panel Discussion

Whether you're drawing a daily strip or a monthly comic book, the steps are usually the same: ruling panel borders, lettering dialog balloons, and drawing the same characters over and over—often in recurring poses. Creating a comic strip with *ComicWorks* is similar to drawing a strip by hand. To start making panels, click on the New Panel tool, select a spot on the screen, and drag the panel to the size you want. Resize and reshape a panel by dragging its handles.

You then use the New Easel tool to produce a drawing area, an *easel,* within a panel. All the familiar *MacPaint* drawing tools work within this easel (see "Launching a Cartoon"). Unlike a *MacPaint* drawing, however, each easel—and the drawing it holds—exists as an autonomous, movable object, which you can move without disturbing other easels and place in front of or behind them. Numerous easels fit in a single panel to illustrate individual elements such as characters, objects, and background. The Easel Switcher tool lets you find a buried easel by flipping through a panel's stack of easels one by one.

(continues)

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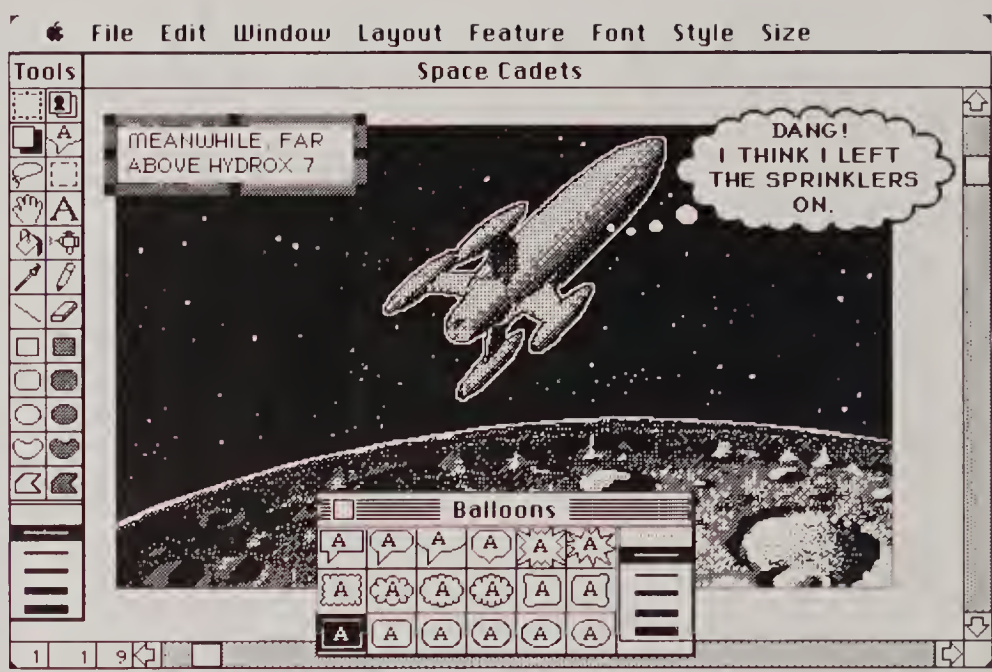


Launching a Cartoon. *The* ComicWorks *screen resembles* MacPaint, *with a few exceptions. Four new tools occupy the top of the tool rack. The palette of dialog balloons, along with the tool rack and other palettes, can be hidden for full-screen drawing.*

Meaningful Dialog

The words of comic characters most often appear within the whimsical confines of dialog balloons. You create balloons by dragging a balloon style from a specialized palette containing balloon-style icons and begin typing in the dialog. Unlike with *MacPaint,* text automatically wraps around to fit within the balloon. You can later change the balloon's shape or size; text reshapes itself to match the new balloon's dimensions. Moreover, you can edit a balloon's text at any time, changing fonts, type sizes, styles, and justification. This word processing capability, combined with the ability to place balloons of any shape or size anywhere on a page, allows *ComicWorks* to double as a page-makeup program. A text-filled rectangular balloon with an invisible border can also be interpreted as a column of text.

You can type text in custom comic fonts such as Crypt and Commando or stick to tamer fare like New York and Geneva (or their LaserWriter equivalents, Times and Helvetica) or add fonts with Apple's Font/DA Mover.

Drawing in Detail

If you thought *MacPaint*'s spray can was pretty good, wait until you see the action on the *ComicWorks* airbrush. You can alter the airbrush's spray size from tiny to large in ten increments by pressing the ten number keys. Then it's up to the plus and minus keys to fine-tune these changes in one-pixel increments. You can also vary the spray density.

Several sizes of FatBits are available, making detail work much easier. And a unique ThinBits feature places a miniature version of the current page next to the full-size page. All of *ComicWorks'* tools and commands work on both pages. Drawing on the full page lets you sketch a large figure or lay out a page without constantly moving the drawing window. The Show Pages command displays a reduced version of two adjacent pages.

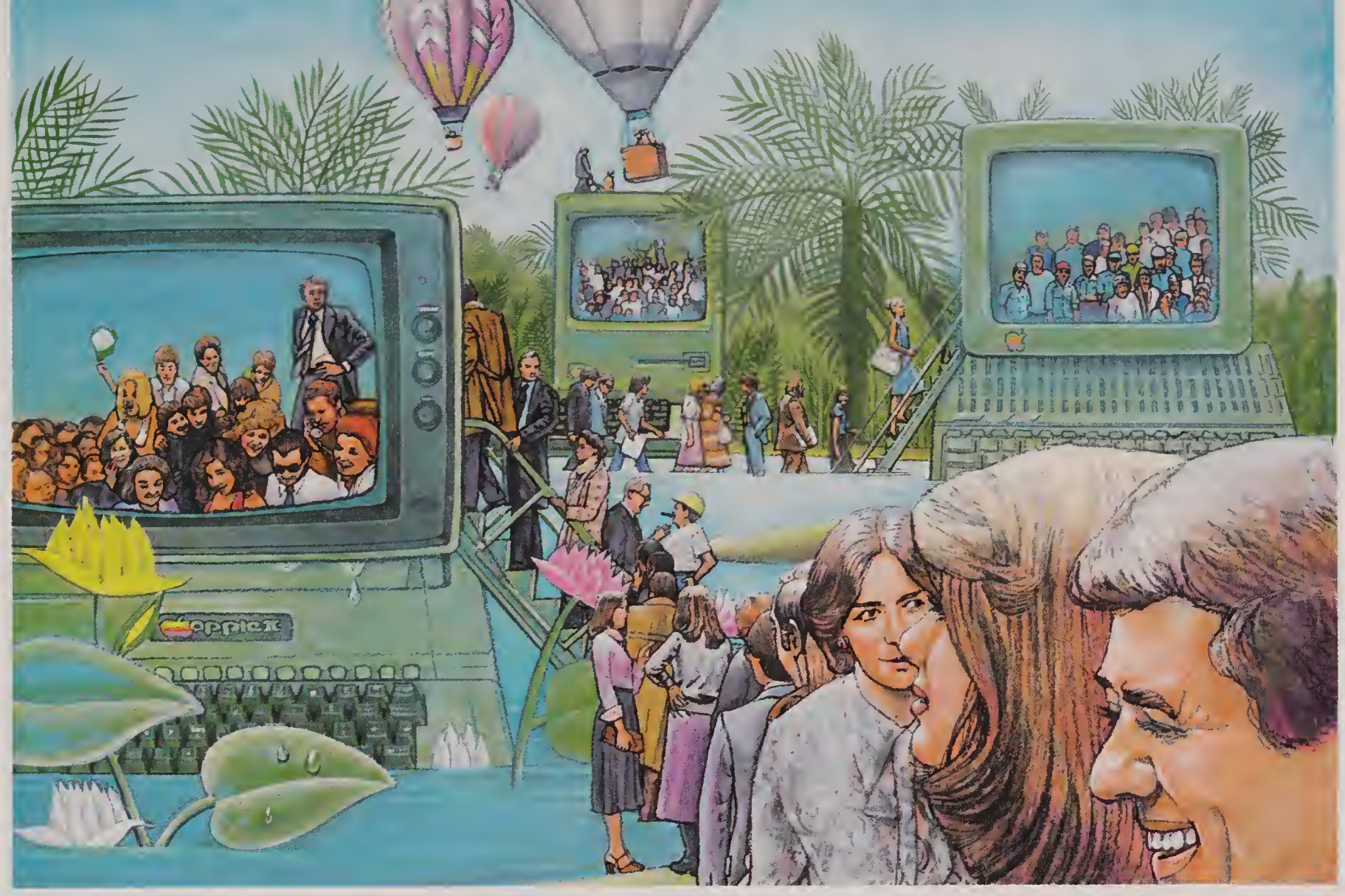
Detail work is further facilitated by buttons that let you move in sequence from page to page, panel to panel, or easel to easel and a grid that resizes to inches, centimeters, or pixels. *ComicWorks* also lets you draw in eight kinds of "ink," which are similar to the special effects in *VideoWorks.* These menu choices let one drawing show through another, reverse blacks and whites when drawings overlap, and so on.

Print and Paste Extras

Art Grabber + and PosterMaker are two additional programs that come with *ComicWorks,* along with a disk of clip art by Mike Saenz, creator of *Shatter,* the first comic book produced with the Macintosh. The ArtGrabber + desk accessory provides easy access to *MacPaint* files from within *ComicWorks.* PosterMaker divides documents into printable subsections for enlarging comic strips or *MacPaint* documents to poster or billboard size. Pasting printed subsections together produces posters as large as 26 feet by 21 feet.

As far as printing goes, *ComicWorks* was designed primarily with the ImageWriter in mind. The program supports the LaserWriter to a certain extent, but printing is slow when bit-mapped graphics and LaserWriter fonts are combined in a document. Like *MacPaint, ComicWorks* doesn't

(continues)



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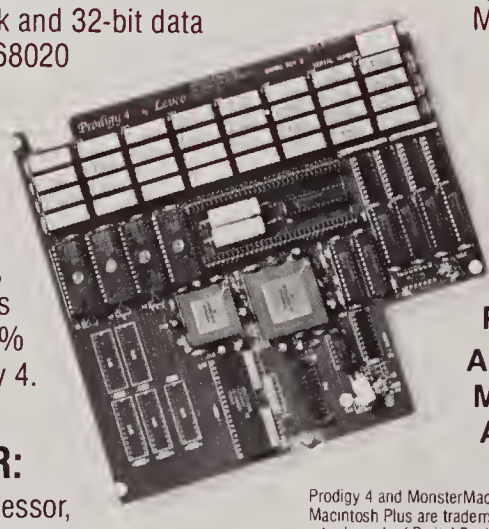

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From the creators of MonsterMac™

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make full use of the LaserWriter's high-resolution potential, and laser-printed art still has the familiar "jaggies."

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–Jay Kinney

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Filing for Less

Software Discoveries' ***Record Holder*** is a plain and functional program that breaks no new data-management ground. However, accompanied by a clearly written manual, it works well for simple filing applications–mailing lists, expense accounts, and other index-card tasks. And it also costs less than its main competitors, *Microsoft File* and Forethought's *FileMaker*. (For reviews of those products, see "File, Macintosh Style," *Macworld,* May 1985, and *Macware Reviews, Macworld,* December 1985.)

In the data department, *Record Holder* lacks the picture fields that make *File* ideal for storing digitized images, and it does not allow you to paste a picture into a form layout, as does *FileMaker*. *Record Holder* handles only text, number, currency, and date values. You can designate computed fields to process values according to a user-specified formula, but *Record Holder* cannot display data as flexibly as its competitors can. For example, dates appear in only one format, and you cannot change a field's alignment to center or right-justify its contents.

(continues)

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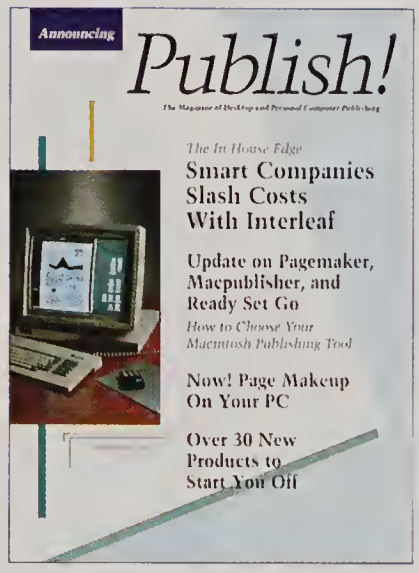

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Record Holder does shine in one crucial area in which *File* and *FileMaker* fall flat. You can specify any field as "required," meaning that it must contain data before *Record Holder* accepts a record. Specifying important fields as required helps ensure that a record is complete.

Forms, Finds, and Reports

Record Holder's form-design facility adequately creates simple data entry and retrieval screens. With the drag function you can position fields anywhere, and all Mac fonts, sizes, and styles are available. A horizontal ruler appears when you're designing a form, but it doesn't allow the precise positioning provided by *FileMaker*'s T square. *Record Holder* also lacks *FileMaker*'s line- and box-drawing tools for sprucing up forms.

Unlike *File* and *FileMaker*, a *Record Holder* database can have only one form layout. Both *File* and *FileMaker* can create a virtually limitless array of forms and switch between them quickly, letting you specify precise entry or retrieval requirements. Also, unlike *File*, *Record Holder* can't show a database in table form, a format useful for quick browsing and proofreading.

Record Holder's form features may be limited, but its data entry and searching talents aren't. A complete set of ⌘-key shortcuts lets you zip through data entry sessions without having to reach for the mouse. You can even move the cursor left and right using the arrow keys on a numeric keypad or by pressing Option-< and Option->. And to cut down on repetitive typing, *Record Holder* lets you specify that fields not be cleared when a record is added.

Record Holder makes it easy to locate data. Menu commands and an icon in the form window let you browse through a database one record at a time (see "Browsing Records"). To locate specific records, you can type search criteria in the What to Find window. *Record Holder* allows more specific search specifications than either *File* or *FileMaker*. Along with relational operators (greater-than, less-than, equal-to), you can use logical operators (AND, OR, NOT) to create very specific search specifications (for example, all employees earning less than $20,000 or more than $30,000 who do not work in the accounting department).

(continues)

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Ted Benhari is Public Information Officer at Dominican Hospital in Santa Cruz, CA. He is very much into Desktop Publishing. He produces numerous publications for the hospital, including "The Dominigram," a magazine for the general public, "The Scanner," a newsletter for employees, and a catalog promoting various classes at the hospital's Education Center. Ted likes having the ability to digitize three-dimensional objects. **He can go from live action to his newsletter in seconds.** MacVision™ saves him time and money and gives him tremendous creative flexibility in his publishing efforts. If you need to image three-dimensional objects (buildings, displays, people, products, etc. as well as flat art) you will need MacVision.™ It's that simple. And **each MacVision™ package contains valuable coupons** for special discounts on color and black-and-white cameras so you can go from live action to print in seconds. **Save $366 on a Panasonic Camcorder and $85 on a black and white camera.** MacVision™ is available at leading computer dealers everywhere.

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The Scanner

DOMINICAN HOSPITAL EMPLOYEE NEWSLETTER

VOLUME 1, NUMBER 7 AUGUST, 1986

Alphonse Castaneda...Blooming Genius

The gorgeous orchid corsages at the Hospital's Employee Service Award Dinner came not from some South American jungle, but from the carefully tended plants grown locally by **Alphonse Castaneda** the instrument technician in the Surgery Department

Alphonse has been growing orchids for seven years. Bloomed from a hobby into a part-time vocation, his orchids are in great demand by local flower marts for retailing to the public

Orchids' delicate beauty belies their durability. They make great gifts - a cut stem laden with flowers, called a spray, can last for one to two months, Alphonse says

He grows his plants by cloning them in petri dishes, or combines varieties through hybridization. The work is exacting, as is his delicate adjustments of the sophisticated surgical equipment

My job here is to make sure everything used in an operation is working properly,' says Alphonse. "It requires great care and the ability to troubleshoot during a procedure if something isn't working as well as it should

Alphonse's expertise goes beyond mere maintenance. He redesigned a surgical saw used for cutting bone blocks for vertebra fusions. The improvement makes the procedure go a lot faster. Alphonse says with justifiable pride

Alphonse was a prime mover in organizing the Hospital softball teams, although his schedule doesn't permit him to play this year. The teams boost morale by helping people from different departments get to know each other as people," he says, not just as functions."

This is very important to Alphonse, who, as anyone who knows him with all firm, is a real people person, with a well-deserved reputation for kindness and generosity

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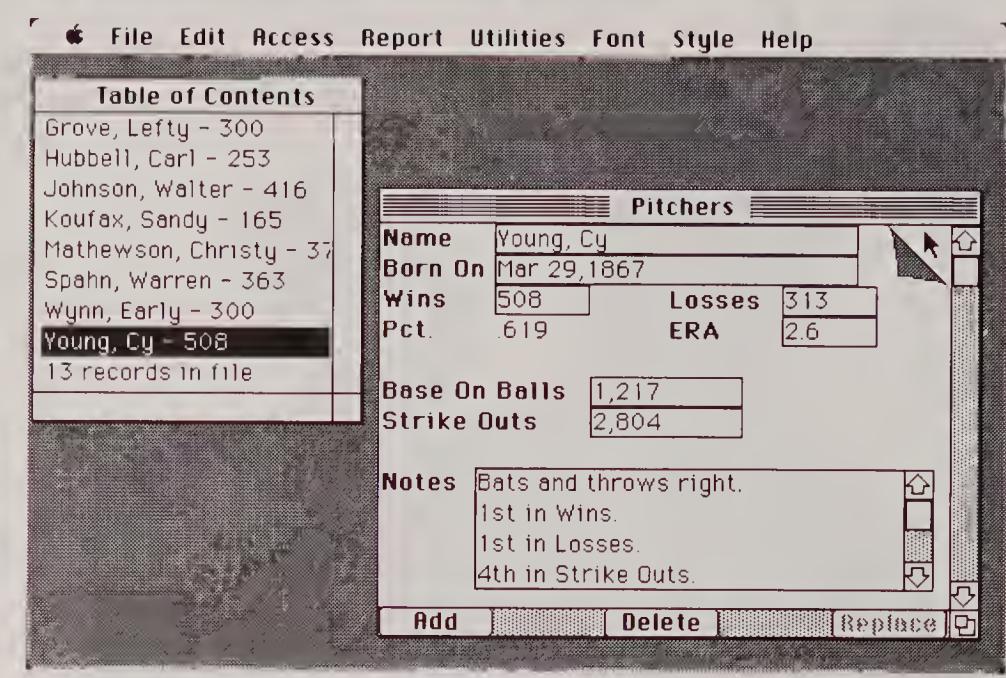
Record Holder's unique Table of Contents window lets you locate a specific record by selecting its table-of-contents entry, a less technical way of referring to a database's index fields—the fields on which a database is sorted. You can see roughly 18 table-of-contents entries at once, meaning you have one-click access to 18 records. As the Mac's Open dialog box does, *Record Holder* scrolls to the first file that begins with a typed character.

Record Holder's reporting features let you put data on paper easily and effectively. You can create tabular reports with headers (no footers, however) and generate free-form reports such as invoices or forms. Like its competition, *Record Holder* prints totals and averages, though the minimum, maximum, and standard deviation functions available in *File* are missing. Unlike its peers, *Record Holder* can print more than one mailing label across the page, giving you more choices when shopping for labels. *Record Holder* also lets you preview a report on screen before printing, compensating somewhat for the lack of a tabular display.



Browsing Records *With* Record Holder *you can leaf through a database by clicking the browse icon. You can also jump to a given record by clicking its entry in the Table of Contents window or by typing its first few characters. Also noteworthy are the vertical scroll bars that* Record Holder *adds to lengthy text fields.*

Record Holder communicates with other programs through its Import and Export commands, which read or save files whose records are separated by carriage return codes and whose fields are separated by tab characters or commas. *Record Holder* can't access SYLK files as can *FileMaker,* but its data-interchange features are sufficient for exchanging files with other data managers such as *Interlace, Microsoft File,* and *Helix*—or with word processors.

Not Lost in the Crowd

Despite some shortcomings—only one form layout per file, no graphics capabilities, and few functions for analyzing data in reports—*Record Holder* commands a place in the crowded market of Mac data managers. Its searching and browsing skills are strong, its manual and help screens are

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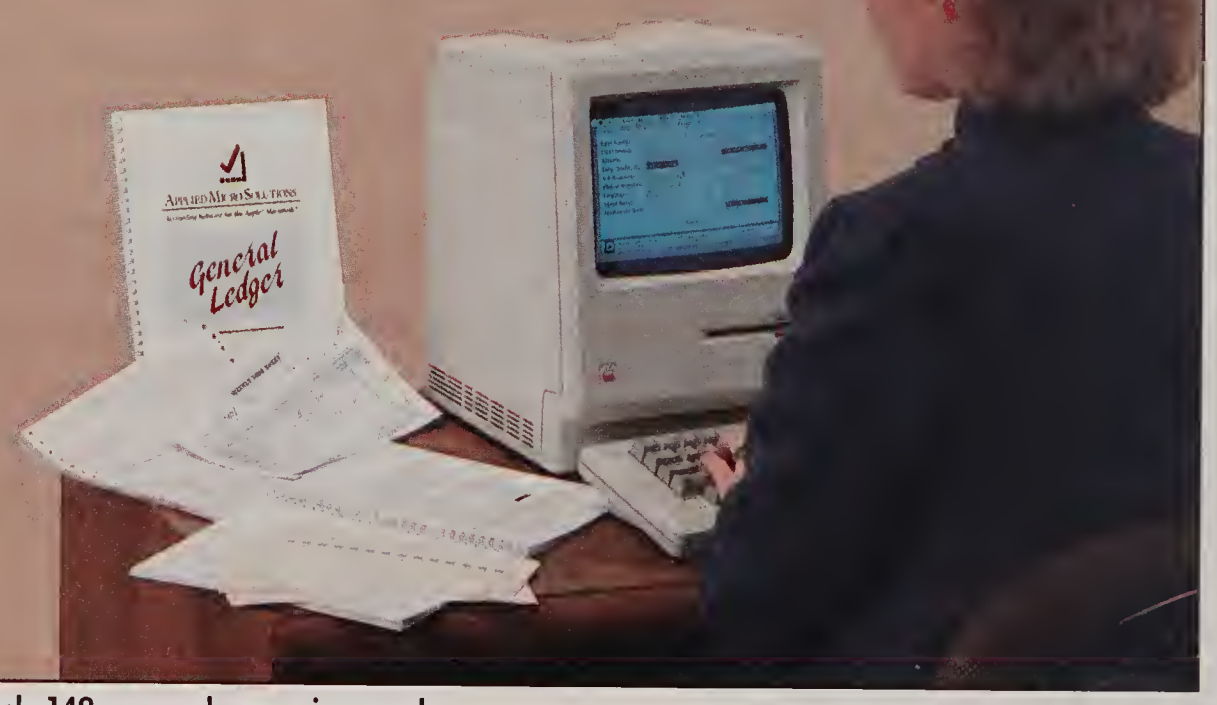

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MARK ULRICH

clear and concise, and it's only a bit harder to use than a notebook or index card file. And at $49.95, it isn't much more expensive, either. Software Discoveries plans to up the ante to $69.95 in October, but even that beats the competition. *Record Holder* brings simple, effective filing within anyone's reach. Maybe it does break new ground after all. *–Jim Heid*

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Paint Your Bandwagon

Although *MacPaint* is an excellent program, most of us have lists of features we wish it had. Several companies have recently come up with their own piecemeal solutions: T/Maker Graphics' *ClickArt Effects* rotates and slants objects, while Silicon Beach Software's *Paint Cutter* takes care of cutting and pasting large sections of drawings.

The first company to transform its wish list into a stand-alone program was Ann Arbor Softworks. Its program, ***FullPaint,*** is a significant improvement on *MacPaint,* combining the features of several *MacPaint* add-ons with a number of other good ideas. *FullPaint* is not a revolutionary advance in Macintosh graphics software. Indeed, at first glance *FullPaint* looks just like *MacPaint.* But a keen eye will quickly discern a few additions to the *MacPaint* screen: a menu called Windows, scroll bars and a grow box in the document window, and three new icons at the bottom of the tool palette. Together they comprise *FullPaint*'s two major advances: the ability to access up to four documents simultaneously and the ability to work on a document that fills the entire screen.

Windows and Views

After opening two or more windows, you can cut and paste sections of one document into another without having to close any files or use a desk accessory like *QuickPaint* or *Art Grabber.* You can arrange the windows any way you like by resizing them with the grow box and moving them with the title bar. Double-click on the title bar, and a window expands to the edges of the screen. Double-click again, and it shrinks to its previous size. With the

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Windows menu you can bring hidden windows into view or rearrange them neatly on the screen. Unlike *MacPaint, FullPaint* lets you keep desk accessory windows open for reference while you work.

The three icons at the bottom of the tool palette represent the program's three view options. Clicking the left-hand icon produces a view similar to *MacPaint*'s screen layout. The central icon expands a document so that it fills the screen up to the menu bar; scroll bars and title bar are missing, and the tool and pattern palettes sit on top of the document (see "The Big Screen"). The icon on the right provides a full-screen view that obliterates the menu bar (although many commands and the menu bar itself are still accessible through ⌘-key combinations). In all three viewing modes, the palettes can be dragged anywhere on the screen and can even be removed or recalled by pressing the space bar.

The Big Screen
In FullPaint*'s full-screen view, the active document fills the entire screen, and the palettes float above it. The palettes can be placed anywhere on the screen or erased by pressing the space bar, and many tools can pass "underneath" the palettes as if they weren't there.*

Improved Tools

Although the three view icons are the only additions to the tool palette itself, *FullPaint* has enhanced the functions of many existing tools. For example, not only can you choose a brush shape but you can create your own brushes as well. The Option, Shift, and ⌘ keys play a much wider (and often more consistent) role in the use of several tools. For instance, many *MacPaint* masters know that pressing Option while using the pencil changes the pencil into the hand, allowing them to move the drawing area. In *FullPaint,* this time-saving technique also works with the eraser. Other tool and keystroke combinations allow you to select areas larger than the window, type white letters on a black background, and perform other useful operations. And the program provides enough ⌘-key equivalents to use up almost every letter in the alphabet. In addition, *FullPaint* tops *MacPaint* in the docu-

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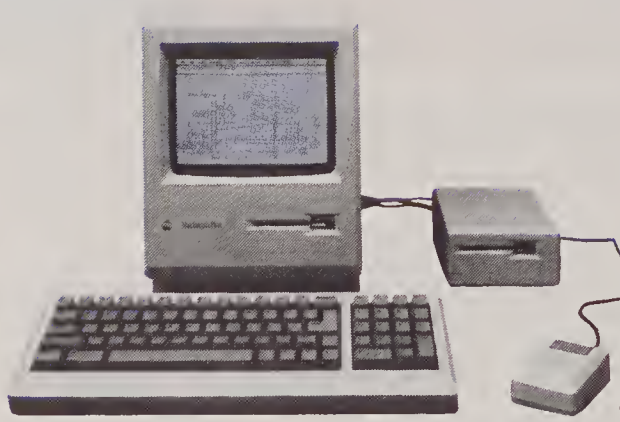

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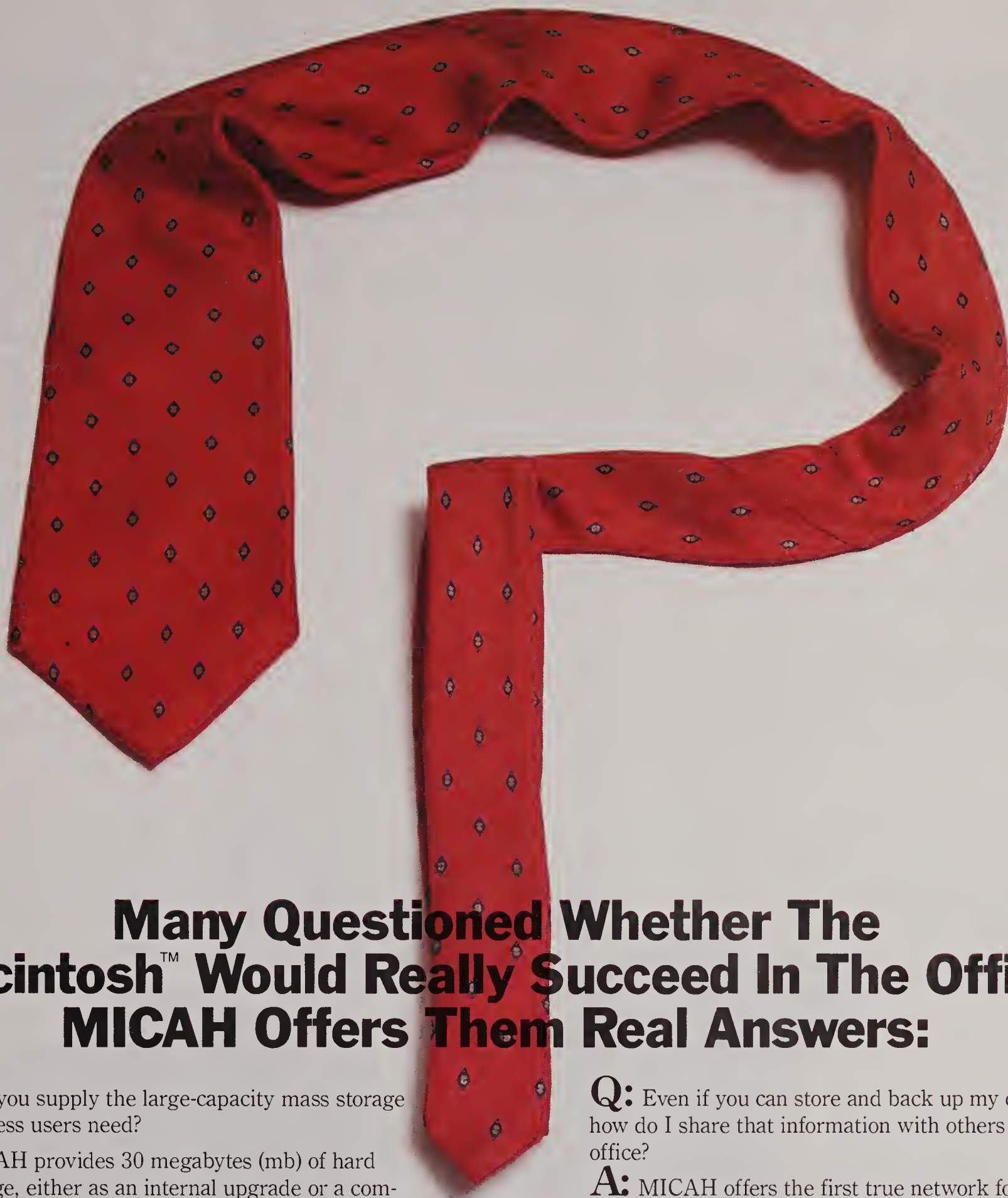

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mentation department; the program's 94-page manual far exceeds *MacPaint*'s skimpy one.

FullPaint adds a number of bells and whistles likely to be found on many people's *MacPaint* wish lists. These include four special-effects commands similar to those found in *ClickArt Effects:* Free Rotate, Distort, Perspective, and Skew. You can add a custom font size (from 1-point to 127-point) to the FontSize menu, although most of the resulting fonts are not too attractive. One convenient option lets you double-click on an object to lasso it, rather than painstakingly surround it with the lasso. FatBits AutoScroll scrolls the window when you reach the edge, allowing you to continue drawing without jumping in and out of FatBits.

Several *FullPaint* features prove helpful for precision work. The program contains rulers that can measure inches, picas, centimeters, or pixels. The Mouse Crawl option restricts drawing tools to one-pixel increments. Mouse Crawl makes the most sense combined with MouseSpot, a small window that displays the current pointer location and the dimensions of any object created by dragging, such as a rectangle or a circle.

On Compatibility, Printing, and Life

MacPaint is an eminently compatible program that allows you to transfer illustrations into documents produced by other programs; *FullPaint* shares this ability. I combined *FullPaint* documents with those of several other applications, including *PageMaker, PictureBase, MacWrite,* and *Microsoft Word,* and encountered no compatibility problems.

When you're ready for some hard copy, *FullPaint* offers a range of printing options. An ImageWriter can print an entire document or a section at normal, half, double, or quadruple size (enlarged documents are printed on more than one page, if necessary). A LaserWriter can produce copy anywhere between 25 and 400 percent of original size. *FullPaint* also includes LaserPrint, a program that enhances a document's appearance for high-resolution (150 and 300 dots per inch) printing.

A final note: a *FullPaint* goody that probably never graced anyone's wish list but that is entertaining nonetheless is the Game of Life. If you're experiencing illustrator's block and want to while away a few minutes, surround an area with the marquee and press ⌘-Option-L repeatedly. Select Undo to restore your drawing.

Full Enough?

With such an abundance of new features, what could anyone find to complain about? Not much, actually, but enough to make at least a few people think twice before buying *FullPaint.* The most serious drawbacks? It lacks full-page drawing capability and a horizontal, or landscape, mode. In addition, *FullPaint* is clearly geared to the new, Mac Plus generation. That's no concern for the growing number of Mac Plus owners, but it can be for the rest of us. For example, you can use *FullPaint* with *Switcher,* but not on a 512K Mac (unless you enjoy shifting from *Switcher* to *FullPaint* and back). Also, on a 512K Mac

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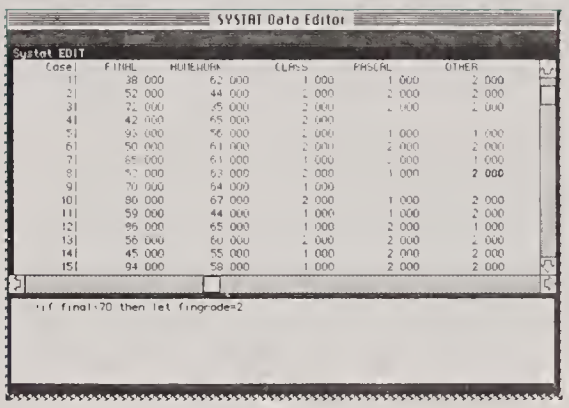

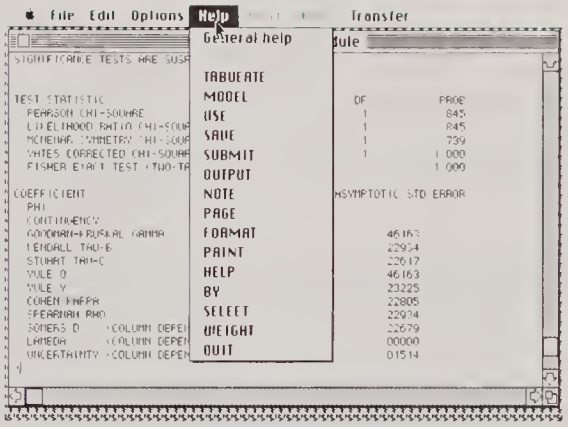

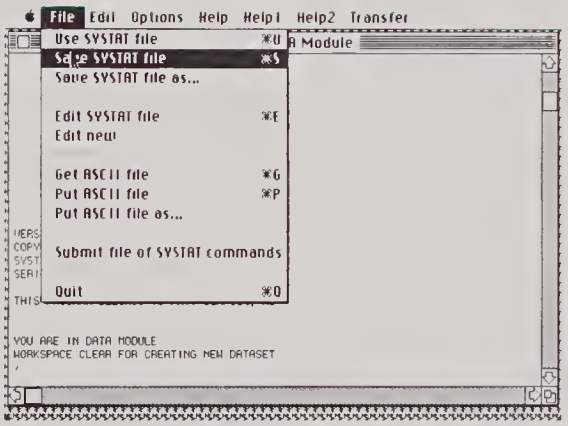

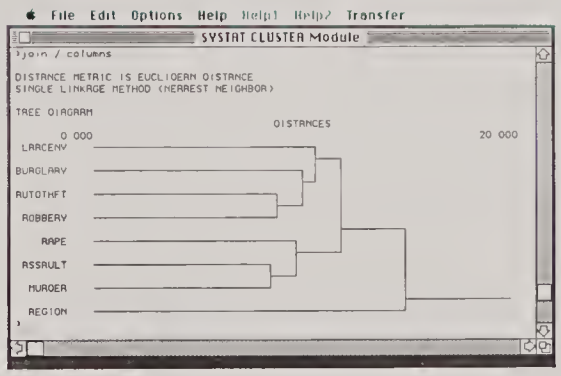

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it's impossible to open four documents at once—the program allows you access to only three. But the program's worst sin may be its key disk copy-protection scheme (hard disk owners get two hard disk installs that do not require a key disk), which results in unnecessary aggravation and a black mark on an otherwise respectable program.

FullPaint is a powerful tool that transcends the features you can get by souping up *MacPaint* with various add-ons. But the program is, as they say, evolutionary, not revolutionary. Mac Plus owners are the logical candidates for a *FullPaint* purchase, since *MacPaint* is not bundled with the Plus and is more expensive and less versatile than *FullPaint*. Owners of 512K Macs who already have *MacPaint* should think carefully before buying *FullPaint*, especially if they already own *MacPaint* add-ons.—*Robert C. Eckhardt*

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Order out of Chaos

Outline processors let you toss ideas onto your computer screen and shunt them around until they make sense. ***MaxThink***, by MaxThink, closely follows the format set by its sole competitors in the Mac outline marketplace—Living Videotext's *ThinkTank* and *ThinkTank 512*. The program's underlying hierarchical structure organizes topics into headings with subtopics, prefaced by a plus sign, and headings without subtopics, indicated with a minus sign (see "A MaxThink Screen"). A few keystrokes or mouse clicks change a topic to a subtopic or reorder existing headings. Unlike *ThinkTank*, *MaxThink* lets you expand a single entry into several pages of text, but you can't add graphics to an outline. *MaxThink* provides the essential tools for creating coherent outlines and includes on-screen tutorials, all for just $89—less than half the price of *ThinkTank 512*.

Movers and Shapers

Although you'll find more ways to organize headlines using *MaxThink* than with *ThinkTank*, *MaxThink*'s default mode for moving headlines is a slow, four-

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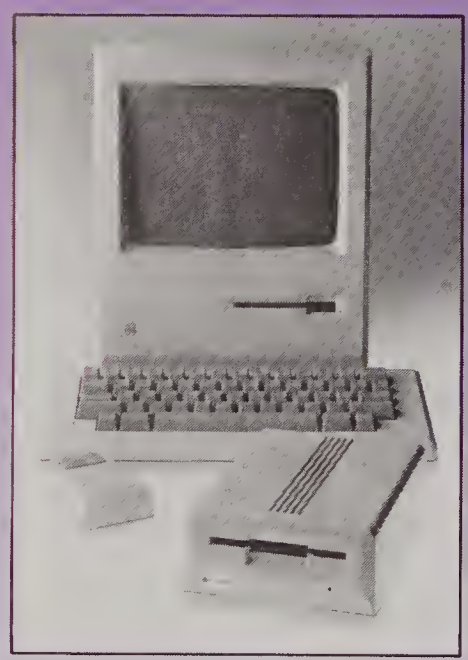

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step process: click on a heading, cut it to the Clipboard, click on a destination heading, and select Paste, Paste After, or Paste Before from the Edit menu. A more direct method, Fast-Move, cuts the steps in half but must first be invoked through keyboard commands or a menu selection. Click on a topic, and it disappears; click on a second topic, and the hidden topic reappears above the current one or as a subtopic, depending on where you're positioned. In contrast to *ThinkTank, MaxThink* also streamlines operations on a range of headings: simply stretch a rectangle around desired topics and choose a command such as Cut or Copy. Select All instantly captures the entire outline as a range.

MaxThink's Sort menu provides five separate functions for reorganizing headings. Prioritize lets you click on headings one by one to create a newly ordered outline. Binsort lets you designate any number of topics as categories, or "bins," and then assign separate headings to each. Both are good features, but you must leave the main outline to perform them. The other three sort functions alphabetize headings, remove all indentations, and randomly reorder headings (to produce "new patterns of thought," according to the manual).

Other organizing functions include Toggle Expand, which suppresses or expands all subtopics under a selected range of topics; it is especially useful for developing consistency among headlines at equal levels. The Markers function, which works like a telephone's auto-dial, finds up to eight preselected topics automatically. Use it for permanent headings like phone numbers, schedules, and daily to-do lists. Unfortunately, if you change a topic's text, the marker text associated with it does not change.

Some *MaxThink* functions have limited value. Search finds only the first occurrence of designated text, Join combines separate entries into one long heading, and Divide separates a multiple-line text entry into individual headings. Join can be useful for combining several topics into one, but you must usually edit the joined headline to have it make any sense. Divide does not let you determine where text will be split. Reclaim resurrects erased headings, starting with the most recent deletion. It works well with topics you have deleted with Clear, but not with the more commonly used Cut command.

From Topic to Text

Unlike *ThinkTank, MaxThink*'s word processing features are fully integrated into the outline—you can stretch a single entry into several pages of text without calling up a separate function. However, this is no-frills text editing, offering basic word-wrap and cut-and-paste but no formatting functions. For any substantive writing, you will undoubtedly prefer *MaxThink*'s Write command to create a text file readable by a word processor. Such files created with a word processor can be opened as a *MaxThink* outline; all incoming text appears as a single outline entry.

Printing involves choosing from the Page Setup menu among ten print format options covering margins, indentations, and spacing. The default line numbering scheme replaces the outline's plus and minus signs with consecutive letters and numbers. You can change the scheme and view your formatted outline before saving it or sending it to the printer.

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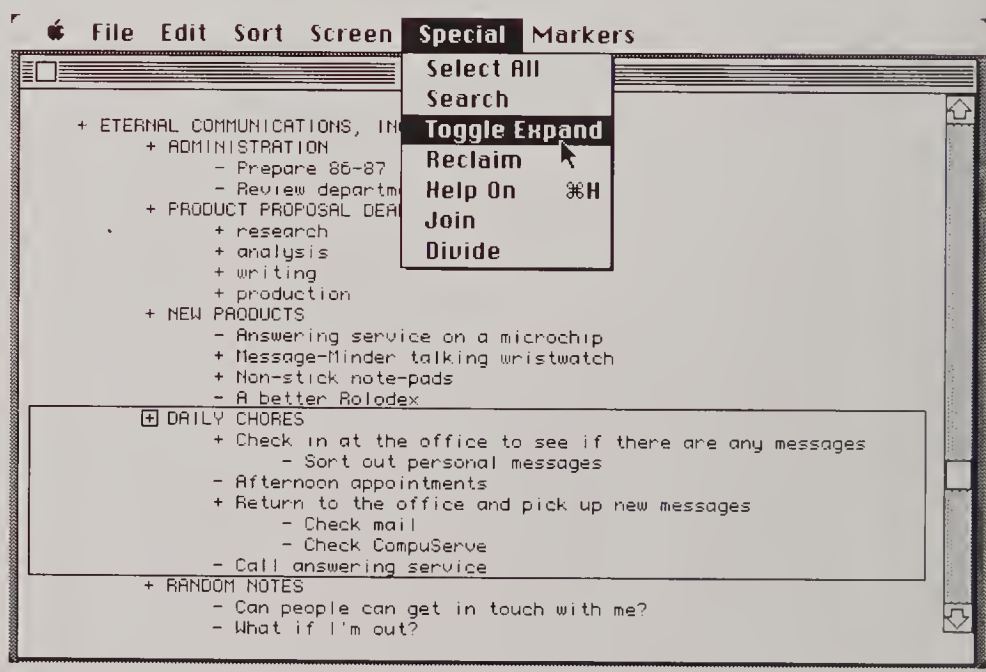

A MaxThink Screen
Topics without subheads are preceded by minus signs, and topics with subheads, by plus signs. When printed, headings are numbered and lettered consecutively. If you want a command to affect more than one topic, stretch a rectangle around the desired range and select the command.

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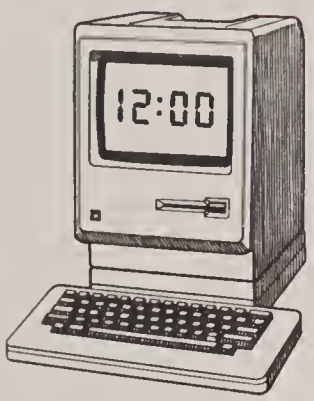

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Three Gripes

Although my general complaints about *MaxThink* aren't earthshaking, they aren't trivial either. First, *MaxThink* takes minimal advantage of the Mac's graphics capabilities. Text appears in a bland 9-point Monaco font with no optional typefaces, and graphics cannot be included in an outline. Second, programming oversights make file management confusing: *MaxThink* asks if you want to save changes when quitting or closing files even if you've done no editing, and opening a new file without returning to the desktop forces you to stare at the previous outline's title until you've saved your new outline. Third, the poorly edited *MaxThink* manual takes some getting used to: only 18 of its 78 pages explain how to use the program, and complex program functions are given short shrift. My advice: read the short "how-to" section and ignore the rest.

MaxThink has a free upgrade program. The current version, 2.2, appears bug-free, although our tests determined it won't work on a 128K Mac. The developers claim they're working on that one. *MaxThink* isn't as elegant as *ThinkTank,* but it is a full-featured outliner that gives *ThinkTank 512* a run for its money.—*Reed McManus*

MaxThink, version 2.2
MaxThink
230 Crocker Ave.
Piedmont, CA 94610
800/227-1590, 800/642-2406 in California
List price: $89

Hey Kids!

Apple may be marketing the Macintosh as a business machine, but anyone who's watched a five-year-old playing with *MacPaint* knows that the Mac can also be a wonderful toy and a fine teacher. Although the Mac's graphic interface is easy for children to understand, few programs have been available for them to use. The number of educational programs is slowly growing, however. Great Wave Software recently introduced ***KidsTime,*** a package specifically aimed at three- to eight-year-olds. *KidsTime* includes five programs that teach numbers, the alphabet, and basic music skills. Dollar for dollar, it's hard to find software that offers more educational value and fun.

(continues)

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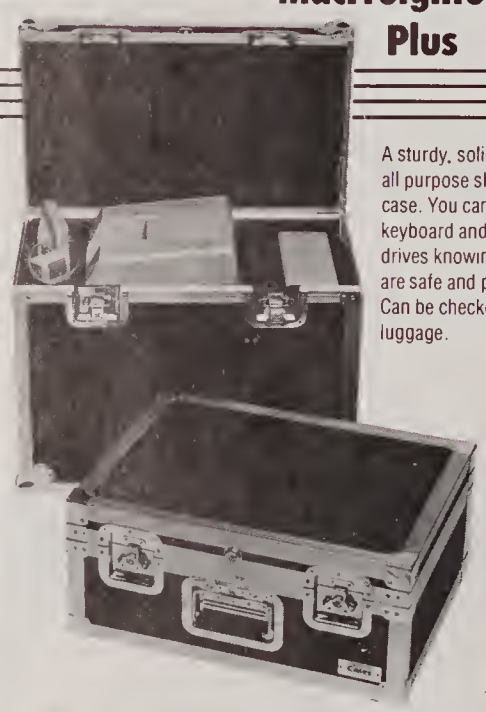

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Dot-to-Dot

Young children will learn the alphabet and numbers by playing Dot-to-Dot, the Mac version of the classic coloring-book activity. The screen shows a sequence of numbered or lettered dots. When all the dots are connected with the mouse, a picture appears. A new puzzle is just a mouse click away. The program comes with ten ready-made puzzles and a puzzle editor that lets you turn *MacPaint* drawings or digitized images into custom dot puzzles.

Match-It

Match-It is really several games, all of which require players to match up cards by dragging them to empty boxes on the screen. Some of the games involve simple matching operations, such as pairing pictures with corresponding letters. Others involve arranging picture fragments into a completed puzzle. The most complex puzzles require the child to fill a two-dimensional matrix, matching shapes with sizes or patterns. Although it wasn't available for this review, a MatchMaker program is promised in the manual that will allow *KidsTime* owners to create their own Match-It puzzles to supplement those that come on the disk.

ABKey

In ABKey, letters and/or pictures appear on the screen. When a child presses the key that corresponds to a letter or a word, it disappears while the computer pronounces it (for example, "uppercase *A*" or "Apple"). While ABKey is a good teaching tool, the keyboard's QWERTY layout may prove confusing to children who have just learned the alphabet. A big improvement would be an ordered set of alphabet buttons at the bottom of the screen that could be clicked to select letters.

Story Writer

Once children are able to find their way around the keyboard, they can graduate to Story Writer, a sort of mini *MacWrite* that includes a voice. Typed words appear in a text window, and a special Storybook font makes each key into a picture (see "Every Picture Tells a Story"). A Key Caps window at the bottom of the screen shows the locations of letters and pictures. Also at the bottom of the screen are several tools, including a potentially dangerous eraser that can instantly clear away hours of creative effort. Fortunately, the eraser is undoable, but only if the child knows where to find Undo in the Edit menu. Younger kids will enjoy listening to stories being read aloud, but they may have trouble finding the Read All menu option. A read icon would be helpful.

KidsNotes

Finally, there's KidsNotes, a program that allows children to create simple melodies using an on-screen piano keyboard or the Mac's keyboard. Once notes are entered on the musical staff, you can change the time values by clicking on note icons located in a second window, but you can't enter the notes onto the staff by dragging them from the icon window. The staff's main purpose seems to be allowing simple editing of songs before they're saved to disk. As with Story Writer, most pre-

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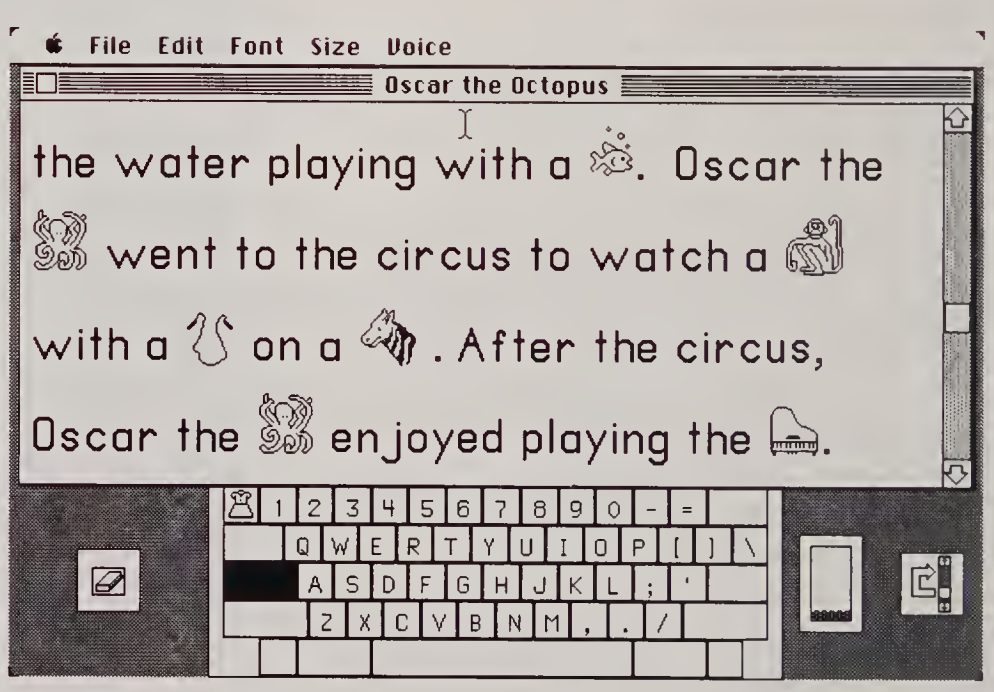

Every Picture Tells a Story
In KidsTime's *Story Writer, pressing the Shift and Option keys reveals a set of pictures hidden beneath the letter keys on the screen. Pictures inserted into the text are read aloud by the computer when Read All is selected from the Voice menu.*

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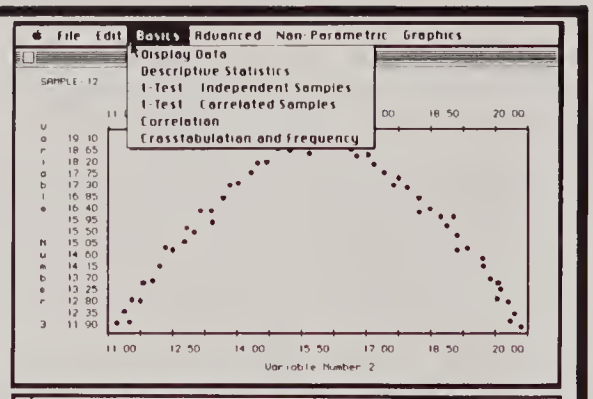

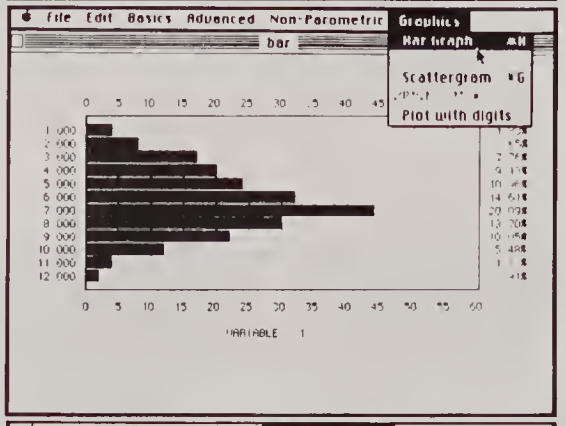

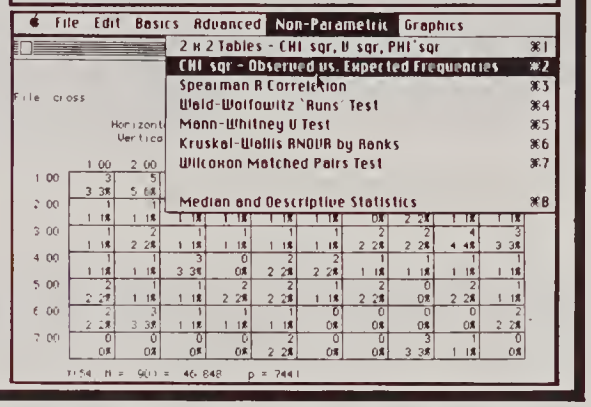

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schoolers will need some help with this program. Unfortunately, kids who can handle KidsNotes by themselves will probably find it of limited interest.

All the Trimmings

The *KidsTime* disk has a special software safety lock that prevents anything from being saved or changed unless a special file is present. Users familiar with the Mac may be frustrated if they dive into *KidsTime* without reading the manual, spend time writing a story or composing a song, and then find out that their composition can't be saved; however, this feature is a wise precaution given the intended users of the program.

KidsTime comes with a thoroughly readable manual that includes a beginner's guide, a discussion of the educational theory, complete instructions for all the games, and tips for advanced use. All in all, the manual is an excellent guide for parents. The only thing missing is a set of instructions aimed at the kids themselves.

Grade Card

Although *KidsTime* is for the most part a well-designed program, young children may have problems using the scroll bars, the pull-down menus, and the keyboard. The designers should have relied more heavily on icons, which even the youngest children can understand. A fully functional Clipboard in Story Writer and Dot-to-Dot would allow parents or children to enhance stories and pictures with other programs, such as *MacWrite* or *Art Grabber.*

But *KidsTime* has so much going for it that these complaints seem minor. The package has so many diverse activities, levels, and features that just about any kid under 12 can enjoy it for hours or days. Simple animation adds reinforcement for young learners, and the computer voice is an effective and exciting teaching tool. The open-ended nature of the program allows parents to create new puzzles, making the games continually fresh, personal, and creative.—*George Beekman*

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(continues)

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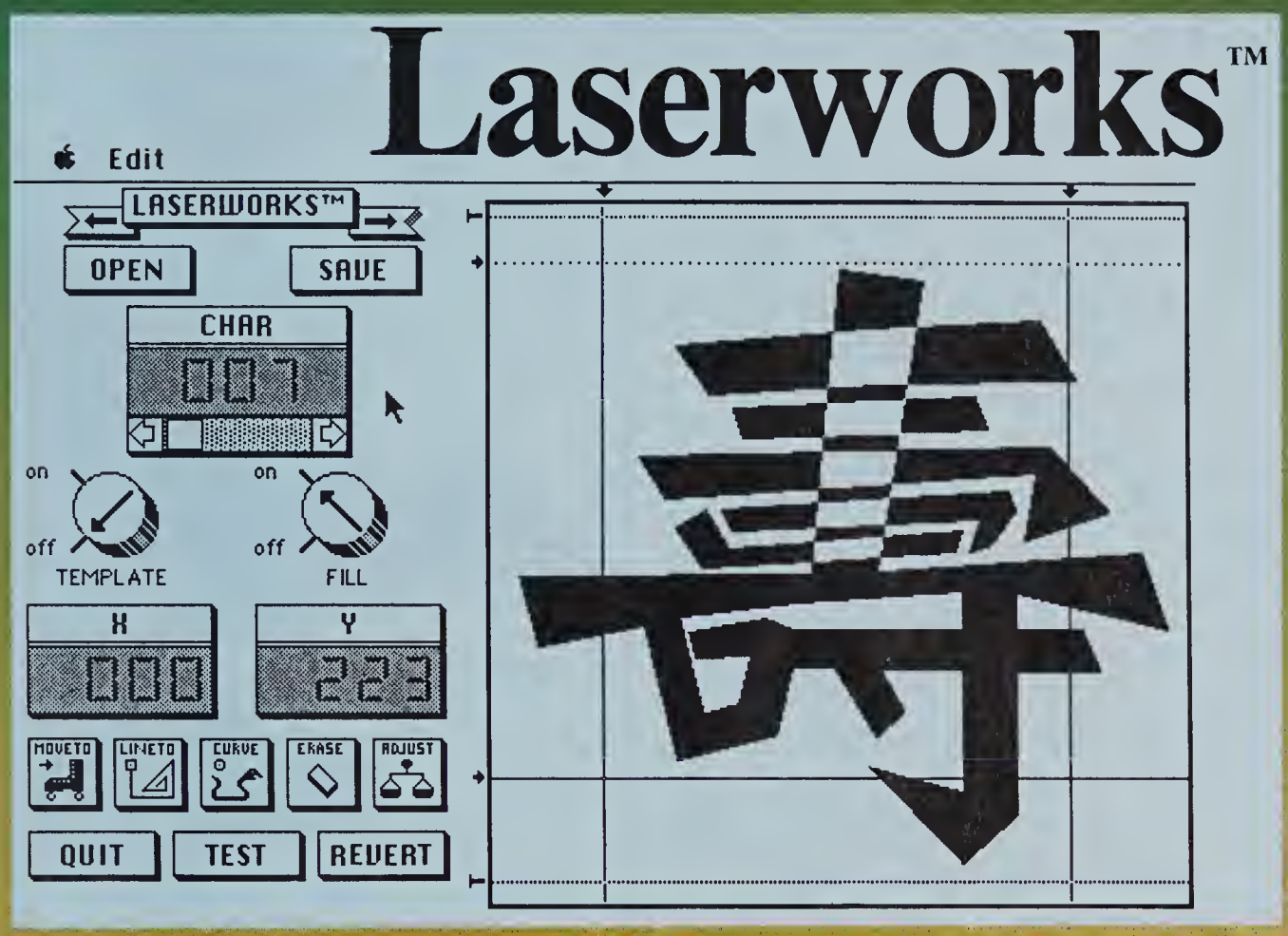

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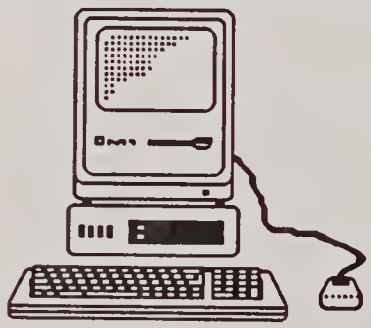

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MARK ULRICH

Ghoul Diggers of '86

If you boot up ***Uninvited*** and have an uncanny feeling you've been there before, it's probably just a touch of *Déjà Vu*—last year's text and graphics adventure game that let Mac owners manipulate objects with the mouse rather than enter Cro-Magnon commands such as "Get book" or "Drop torch" (see *Macware Reviews,* January 1986). Mindscape's latest game is also created by ICOM Simulations, the developer of *Déjà Vu*. *Uninvited* shares *Déjà Vu*'s format, including the ability to move objects, some delightfully sarcastic commentary, and an intriguing and challenging plot.

As the game begins, you awaken at the wheel of your wrecked automobile, discover that your little brother has disappeared, and clamber out of the wreckage and into an adventure that starts out in a Gothic mansion. The object of *Uninvited* is to find your little brother and escape with your lives—not an easy task.

Who Invited You?

Once inside the mansion, you'll encounter a host of unpleasant creatures, but only a few signs of your host's existence. You'll wander through dozens of dilapidated rooms, each artfully illustrated, collecting clues and encountering more than one red herring (see "A Room with a Clue"). You'll find magical incantations in ancient books bearing the sign of the pentagram, but you must figure out how and where to use them. It's quite a thrill the first time you utter a spell and see the results. *Uninvited* surpasses *Déjà Vu* in the use of digitized sounds—thunderclaps, barking dogs, and creaking doors, to name a few—as well as animation. Scuttling spiders, flapping bats, and a most annoying little demon who periodically scampers across the screen all add excitement to the game.

I found myself vacillating between fascination and frustration. Some of the puzzles are quite tricky, and I felt foolish interrogating every chair in the house in an attempt to gain information. In the end I

had to swallow my pride and resort to peeking at a few clues; Mindscape will send a free hint sheet to registered owners upon request.

Save Yourself Some Trouble

If you know what's good for you, you'll save early and often—a single slip can end the game and wipe out a good deal of work. The game's quick reference card advises you not to save games on either of the program's two disks, which are filled with the files necessary to run the game, but to use a separate disk (the easiest method is to eject Disk One and insert a game storage disk). Not a big fan of disk swapping, I discarded the ImageWriter file on Disk One to create ample room for at least one game. (If you want to print out the certificate that appears at the successful conclusion of a game, however, you should leave the ImageWriter file intact.)

Saving games avoids wasted time and effort when you experience an untimely demise, and you should also map the game's terrain, both inside the house and out. Like its text-adventure ancestors, *Uninvited* subjects players to a maze. However, this puzzle exists not only in the imagination, but as a seemingly endless series of illustrations, each with a chamber nearly identical to the last. Adventure game veterans already know this, but I had to learn the hard way: you must draw a map of the maze as you traverse it. And watch out for the zombies!

If you like a good mystery, you should enjoy *Uninvited*. The graphics are skillfully drawn and plentiful, the plot is intricate and amusing (although at times frustrating), and the imaginative sound effects and animation make this game a winner.
—Erfert Nielson

Uninvited
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Across-the-Keyboard Customization

If you use your Macintosh to write in a language other than English, you've experienced the frustrating delay caused by pressing the Option key, pressing the appropriate key for an accent or a diacritical mark, and then typing the accented letter (Option-i, for example, produces a circumflex). Worse yet, you may have to open the Key Caps desk accessory to find out where an accent resides. Now you can customize your keyboard, thanks to ***MacKeymeleon,*** from Avenue Software.

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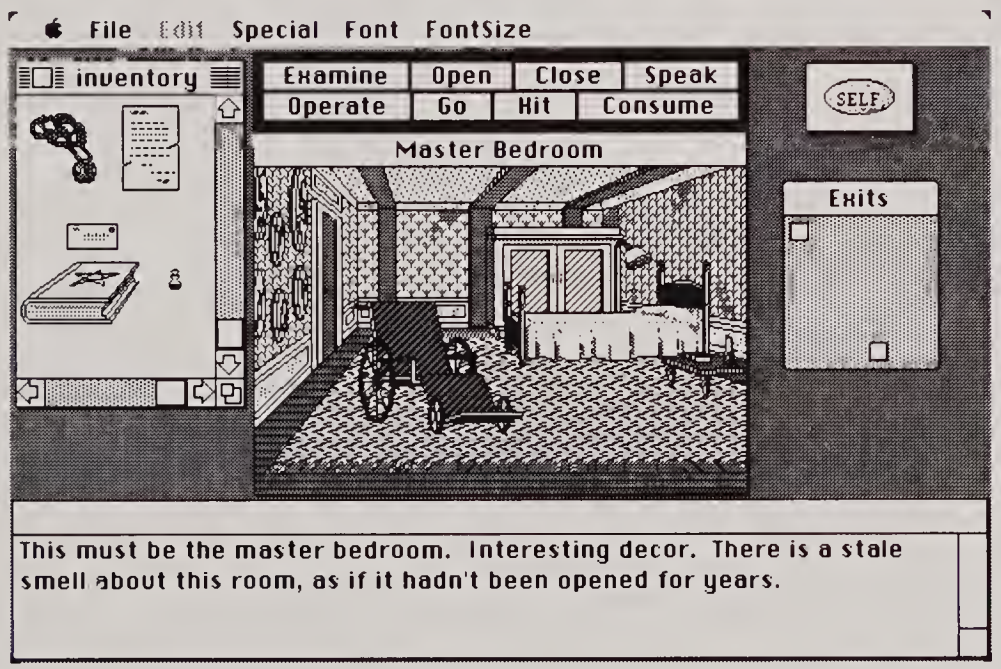

A Room with a Clue
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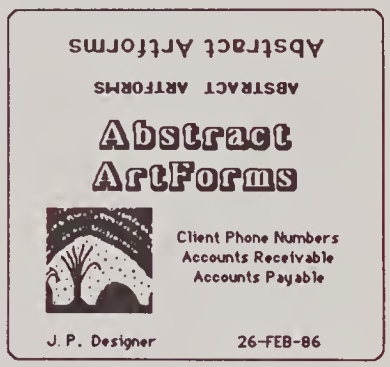

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MacKeymeleon lets you customize the keyboard layout. For example, the standard French keyboard is arranged differently than the QWERTY layout to which American typists are accustomed. You can choose from among 14 standard setups, including standard, French, Italian, and Dvorak. The program offers two fonts, Hénédine 12 and Grondines Bold 24.

The process of designing a keyboard is not difficult, and the program's manual covers the installation procedures well, leading you through a number of examples. You can install several customized keyboards on a word processing disk and have one of these layouts automatically install itself when you insert the disk.

When you add a *MacKeymeleon* keyboard to a disk, the program adds a desk accessory called Keymeleon to your word processor's Apple menu. When you select Keymeleon, a new menu appears on the menu bar. This menu allows you to change from one keyboard layout to another during a word processing session and to select fonts and font sizes. (The developers of *MacKeymeleon* are French-speaking Québecois, so the program's menus are available in French as well as English.) *MacKeymeleon* uses the Key Caps desk accessory to remind you of the locations of your custom keys. If you leave the Key Caps window open below your word processing document window, you'll have a handy map of your keyboard layout.

I encountered a few glitches in *MacKeymeleon,* but nothing that seriously affected the program's performance. For example, the Key Caps desk accessory tends to lag behind your typing, occasionally highlighting keys at random as you type. The manual is generally informative, but the differences between the standard and international keyboards aren't well documented—the inclusion of extra keys on the international keyboards isn't mentioned in the documentation.

On the whole, however, *MacKeymeleon* is an extremely useful program. Now you can have your gâteau and eat it too.—*Emil Flock and Miriam Flock*

MacKeymeleon 1.1
Avenue Software Inc.
1173 Charest Blvd. #250
Québec City, Québec G1N 2C9
Canada
418/682-3088
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(continues)

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The editors of *MacUser* named ThunderScan the Best Peripheral Device of 1985. Here's what they said: "ThunderScan from Thunderware is an astonishing device that transfers images to the Mac by scanning them using a snap-in device that replaces the ImageWriter ribbon...Easy to hook up and use, relatively inexpensive, this device should be owned by anyone who uses graphic images on the Mac."

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In the Black

Black ImageWriter ribbons range in price from $3.95 to $10.50, depending on where you buy them. When they become old and gray, they're usually thrown away. However, there are alternatives. If you use a considerable number of ribbons, you should investigate ***MacInker*** from Computer Friends.

I Ink, Therefore I Am

MacInker is a small plug-in device that reinks fabric ribbons. The model I tested—MacInker 234IM—is designed for ImageWriter I and II ribbons; also available is a Universal Cartridge model that accommodates some 200 cartridge types. The package includes the reinking machine, a felt roller with an ink reservoir, and a bottle of ink. Additional ink (in black, brown, red, green, yellow, purple, orange, gold, and silver) is available for $3 a bottle, $8 for gold or silver. Computer Friends claims that one bottle will reink 25 to 40 ribbons.

MacInker is easy to operate, although becoming a proficient reinker takes some practice. A plastic platform with a spindle turns the ribbon, which in turn loops around the ink-saturated felt roller. To reink a ribbon, you fill the roller's reservoir with ink, place the ribbon cartridge on the platform, pull out a section of ribbon and place it around the roller, and turn on the machine. An ImageWriter ribbon takes about 15 minutes to reink. Ideally, you should let the ribbon sit overnight before using it, to ensure even absorption. According to Computer Friends, a ribbon can be reinked 60 to 100 times, depending on the quality of the fabric and the other components of the ribbon cartridge.

Reinking is not without its frustrations. The first time I used MacInker I applied too much ink, producing a very dark and slightly smudgy printout. Following the instructions in a page of tips included in the package, I reinserted the cartridge in MacInker and wrapped the ribbon around a roll of paper towels to absorb excess ink. The second printout was crisper, but still a bit too dark for my liking. The manufacturer suggested a technique for obtaining a somewhat lighter ribbon: fill the roller's ink reservoir only halfway, then run MacInker for two or three hours. Using this method I finally got satisfactory results.

With a little practice, you should be able to reink ribbons effortlessly. You will, of course, get ink on your hands, but it washes off surprisingly easily. If you use only a few ribbons a year, MacInker is not worth the expense and effort involved. But businesses with heavily used ImageWriters, or even individuals who are prolific users of printers, should consider investing in a MacInker.

Would You Like a Refill?

If you're not the do-it-yourself type, you might want to use the services of American Inc. Products, which manufactures ribbons in black, green, blue, brown, purple, yellow, orange, and silver. Mail a worn-out ribbon cartridge to the company and it will refill the cartridge with a new ribbon for $3.25 ($3.75 for colored ribbons) plus $2.25 shipping. Because of mailing charges, the refills are no bargain if you send only one or two cartridges. But it can be economical for larger orders, since these are good-quality ribbons comparable to those sold in computer stores. And if you don't mind getting your hands dirty, the company also sells ribbons separately for $2.65 for installation in your own cartridges.—*Erfert Nielson*

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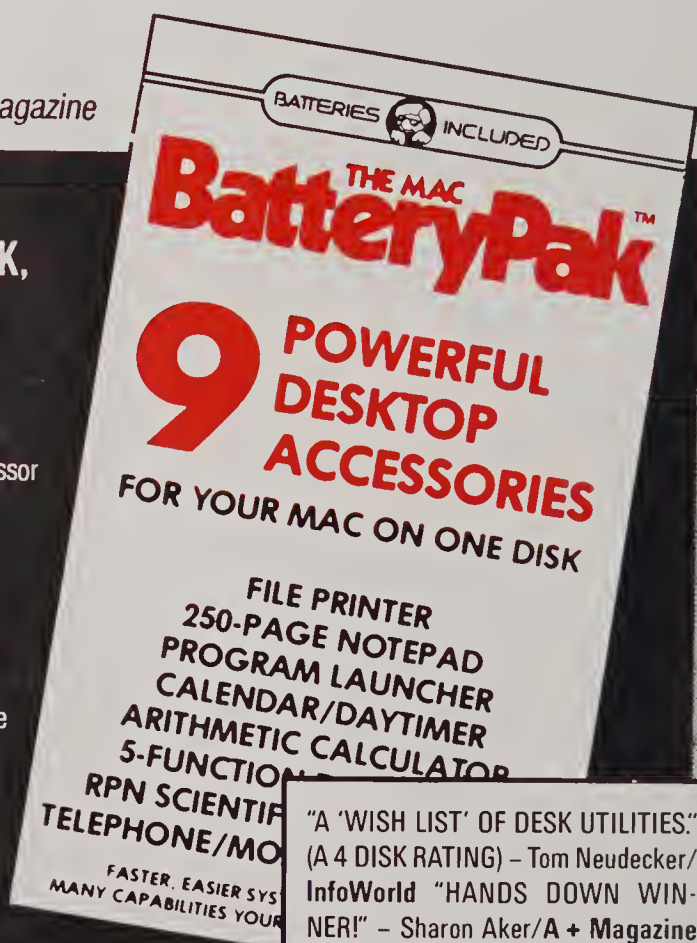

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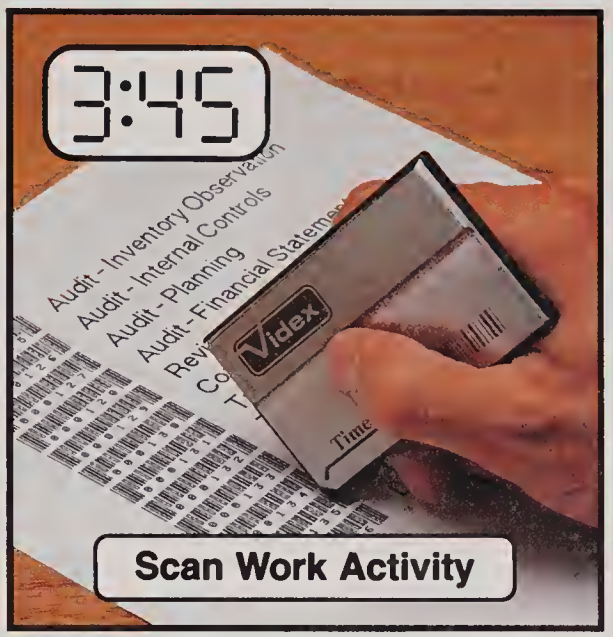

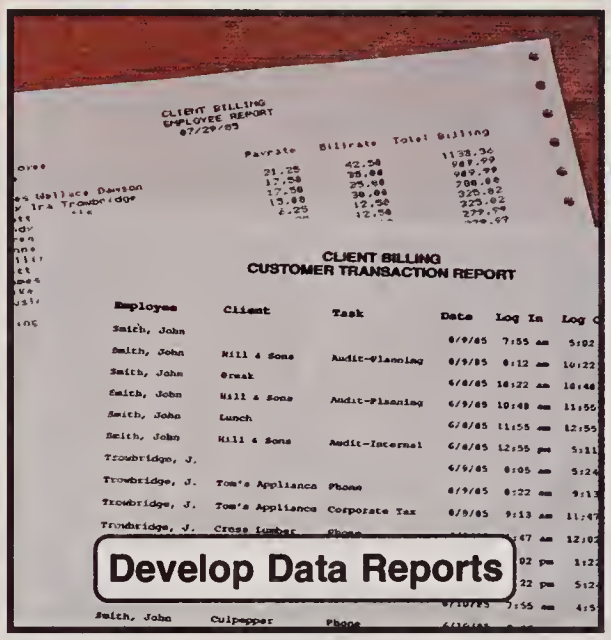

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6415 S.W. Canyon Ct. #10
Portland, OR 97221
800/547-3303, 503/297-2321 in Oregon
List price: ImageWriter model $42, Universal Cartridge model $68.50

American Inc. Products Co.
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San Francisco, CA 94105
415/982-0161
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Star Struck

If you own a 512K Mac, you can get an idea of what space travel is like, thanks to Spectrum HoloByte putting you at the helm of the Space Shuttle Orbiter. There, you are greeted with an intimidating array of dials, buttons, toggle switches, and CRTs that make up the Shuttle's forward control panel. During a mission, the screen divides into quadrants that illustrate the specific CRTs and subpanels you need for each phase of an operation. You can also transform one of the quadrants into a window, allowing you to gaze back at Earth or track a satellite in anticipation of a rendezvous (see "A View from the Bridge").

Orbiter simulates a number of missions, which must be accomplished before the Shuttle's life-support systems run low. A training mission familiarizes novice astronauts with the workings of the vehicle's panels and controls. Following lift-off and the achievement of a stable orbit, your first task is to launch a telescope using the shuttle's mechanical arm. Later, you must perform other missions such as repairing or retrieving a malfunctioning satellite by walking in space. When you have successfully completed each mission, you must finally navigate the craft through the perilous reentry sequence and land it at one of six available sites.

Technology Triumphs

Orbiter is an impressive programming achievement. Every gauge, switch, and control on the panel is fully functional. Each minute movement through the cosmos is tracked on one of three CRTs, which provide the accurate telemetry data necessary to successfully complete your mission. Messages from Mission Control are delivered by a synthesized voice and simultaneously displayed as text on one of the CRTs. The crisp graphics include a "map" view of the Earth and depictions of the ship's position relative to the Earth, the Moon, and other objects in space.

As with the real shuttle, many aspects of your mission are controlled by on-board autopilots and ground control computers. You can disable these fail-safe systems, however, and instead use manual control to get a firsthand taste of space flight.

(continues)

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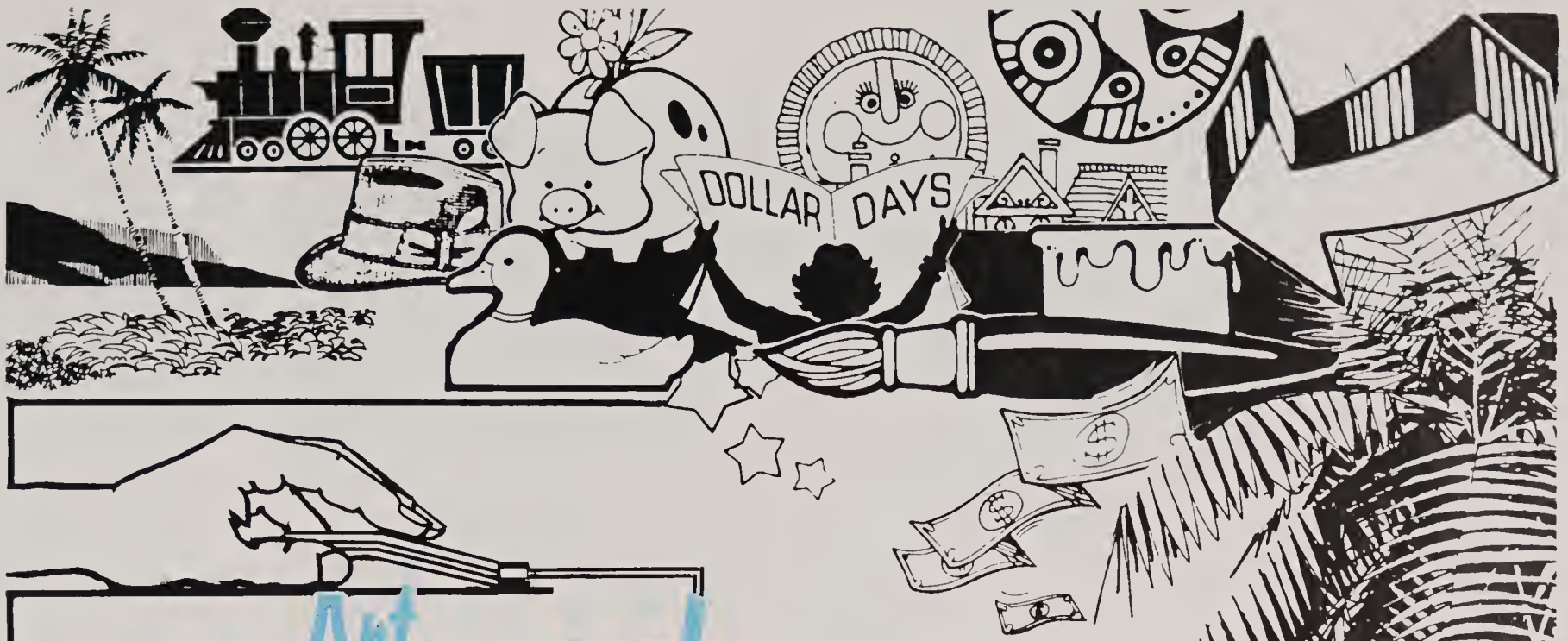

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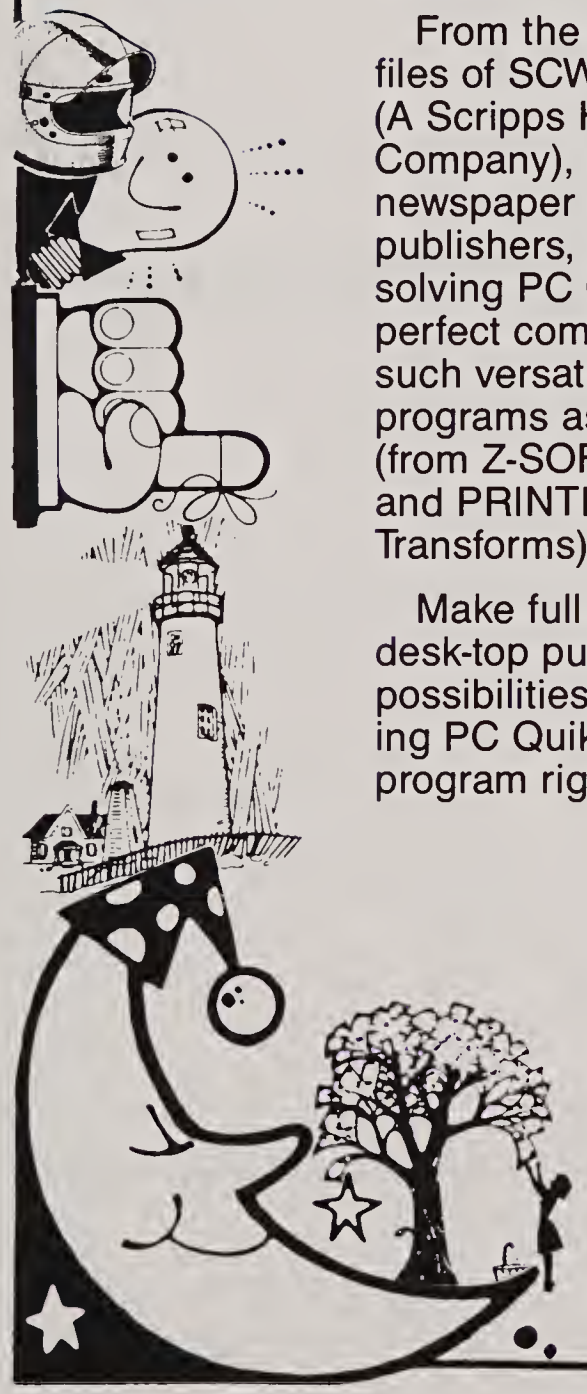

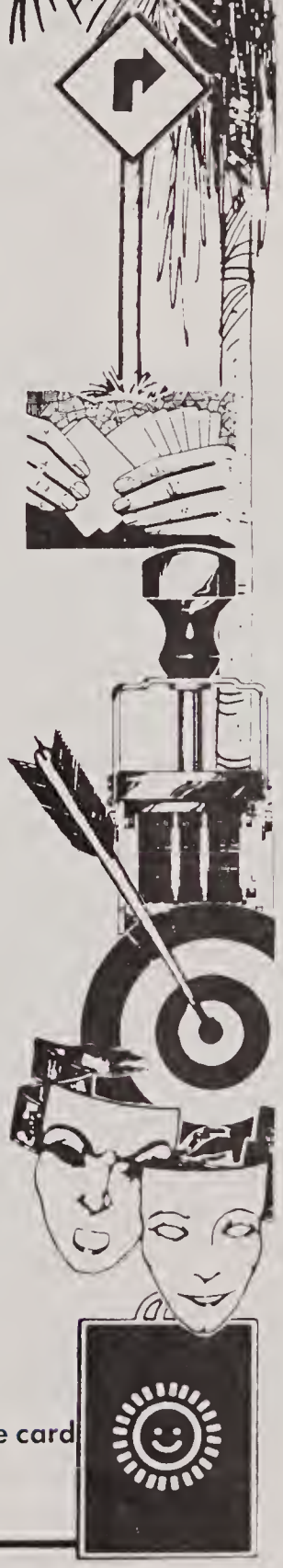

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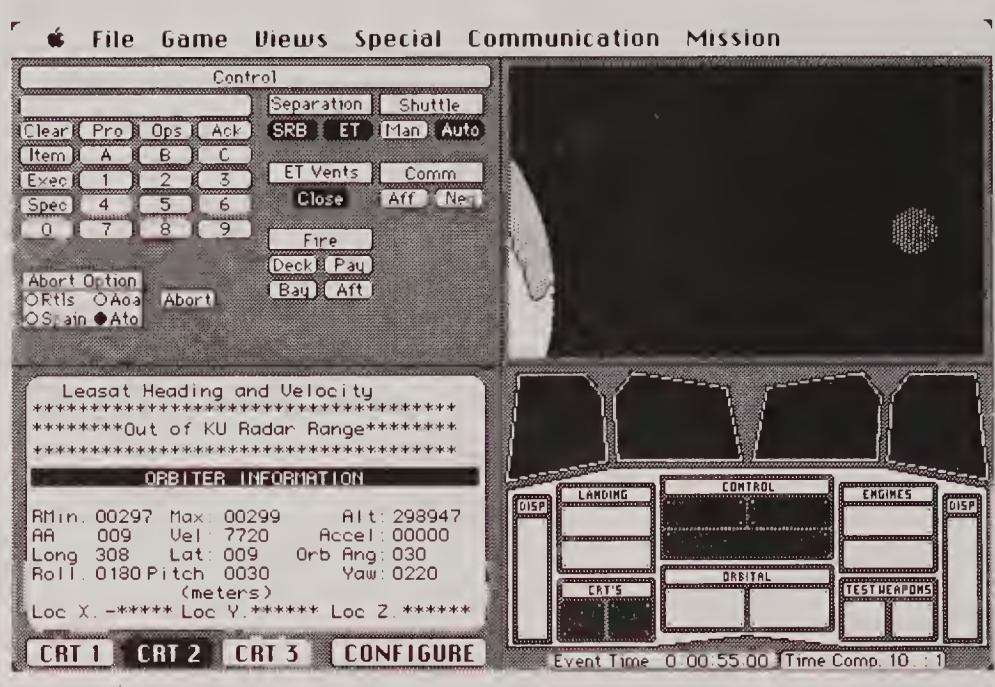
Lost in Space

Maneuvering the shuttle requires precision and practice and at least a basic understanding of space physics. Because you are operating in a vacuum, you must get used to the concept of inertia. Also, you must take into account the curvature of the shuttle's orbit before you can overtake other objects in space.

These and other basic principles of space flight are outlined in *Orbiter*'s manual, but beyond a detailed training mission and an adequate explanation of how to set up display quadrants and access menus, documentation is somewhat limited. For example, it tells you how to retrieve a satellite once you're within docking range but offers few directions for getting that close.

The manual is also rather inadequate when trouble arises. When the Shuttle burned up the first two times I attempted reentry, I was shown a dialog box explaining that my acceleration rate was too high. Unfortunately, I found no suggestions for solving that problem in future missions.



A View from the Bridge
Orbiter*'s screen is divided into quadrants: Control, Engines, CRT, and Forward Main Station. The panel in the lower right lets you select subpanels such as the view outside the shuttle shown here.*

Reality Strikes

Orbiter's designers have gone to great lengths to accurately simulate all aspects of shuttle operation. Ironically, the very realism that makes the simulation so impressive is also responsible for its major weakness: *Orbiter* is ultimately somewhat boring. In his now classic book, *The Right Stuff,* Tom Wolfe describes the test pilots who became our first astronauts as "Spam in a can." The astronauts didn't "fly" their spacecraft—they merely pushed buttons or monitored the activities of on-board and ground computers.

Similarly, when at the controls of *Orbiter,* you simply push buttons and check readouts under the guidance of Mission Control. While my first few missions were entertaining, educational, and challenging,

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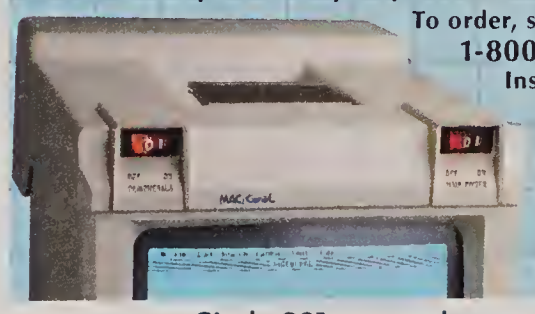

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I soon tired of flying the shuttle. Even with the autopilot disengaged, you encounter long interludes with little to do but languidly cruise through the vastness of space. *Orbiter*'s time-compression feature helps somewhat but doesn't alleviate the monotony altogether.

There is much to like about *Orbiter*. For dedicated students of space travel, it's a must. However, if you want excitement as well as a realistic simulation, you may be happier with a faster-paced program such as Microsoft's *Flight Simulator* or PBI's *Fokker Triplane Flight Simulator*. Unfortunately, many people will find they lack the patience for extended space travel.—*Walter C. Burns*

Orbiter, version 1.0
Spectrum HoloByte Inc.
1050 Walnut #325
Boulder, CO 80302
303/443-0191
List price: $49.95

Making Tracks

Although there are almost as many styles of music programs as there are styles of music, none is more magical to me than the sequencer. Attach a synthesizer to the Macintosh through a Musical Instrument Digital Interface (MIDI) adapter, start up a sequencer program, and the Mac lets you record one track, play it back while recording another, and so on until you've created a complete arrangement. And because the Mac stores not sounds but digital information, each playback is an original performance (for background on music products for the Mac, see "Musical Wares," *Macworld,* February 1986).

Macintosh musicians can choose from several sequencers, from beginner-oriented products like Creative Solutions' *Studio Mac* to professional-caliber products like Southworth Systems' *Total Music* and Mark of the Unicorn's *Professional Performer*.

Also near the high end is ***MegaTrack XL,*** from Musicworks of Boston (not to be confused with Hayden Software's *MusicWorks* program). *MegaTrack XL* is part of Musicworks' *Professional Musician* system, which includes Musicworks' Mac MIDI Star MIDI adapter hardware and Electronic Arts' *Deluxe Music Construction Set* for transcribing sequences into sheet music.

Simple and Straightforward

MegaTrack XL's greatest strength is its intuitive design. Many other sequencers litter the screen with windows, each devoted to a particular function. *MegaTrack XL,* in contrast, divides its functions between menu commands, dialog boxes, and windows, resulting in an uncluttered display and a straightforward, easy-to-use program. Each track you create is shown in the Tracks window, while another window contains four buttons corresponding to the tape controls on a tape deck. To add a track, you simply choose New Track from the Track menu, type a track name, click the Run button, and start playing.

Recorded tracks can be played back as is or altered using numerous track-manipulation features. Looped tracks, which repeat continuously, are useful for bass lines or other repetitive parts. You can *quantize* a track, causing *MegaTrack XL* to correct

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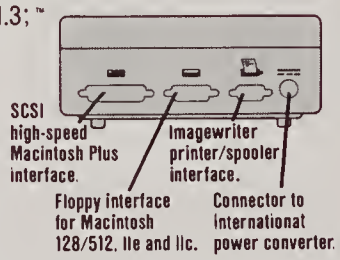

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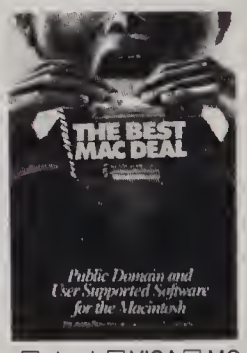

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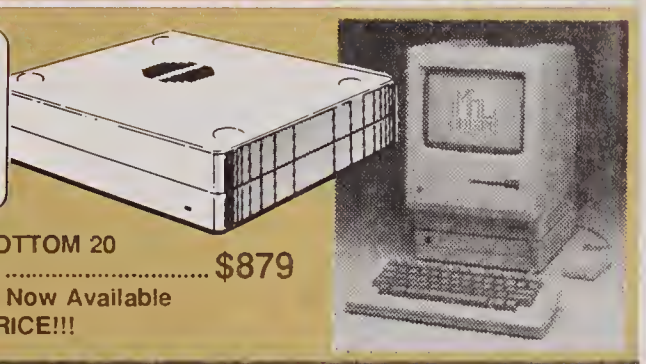

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timing errors by rounding off note values to the nearest beat; change the playback speed; merge several tracks into one; and change the MIDI channel on which the track is played back.

Graphic Editing

Most exciting, however, is *MegaTrack XL*'s track-editing feature, which lets you graphically view and alter notes. Notes in a track are shown in proportional form—with longer notes appearing wider than shorter ones—on a musical staff (see "Changing Notes"). When a track is initially displayed, you see its entire contents. By selecting an area, then double-clicking it, you can zoom in on a particular section to more easily see and edit short notes. This zooming process is infinite; you can continue selecting and double-clicking until even the shortest note is wider than the Mac's screen. *MegaTrack XL*'s graphic editing is easy to use, but it lacks the precise control over a track's contents offered by other sequencers, such as *Professional Performer*.

A Slow Jump

MegaTrack XL has other shortcomings. While you can zoom in on a track for detailed editing, you can't zoom out one or two steps to see the larger picture. You must revert to the full-track view, then zoom in again. Worse, you can't jump to a given point in a piece. To reach the middle of a *MegaTrack XL* sequence, you must use the fast-forward button, which plays the piece at eight times normal speed, until you reach the desired point. The current version of *MegaTrack XL* doesn't let you edit MIDI data such as pitch bends, synthesizer patch changes, and mode changes, although Musicworks representatives told me a future version will offer enhanced editing capabilities as well as the ability to jump to specific points in a score.

To its credit, *MegaTrack XL* does a great deal while taking up a remarkably small 30K of disk space, and it runs on a 128K Mac, while *Professional Performer,*

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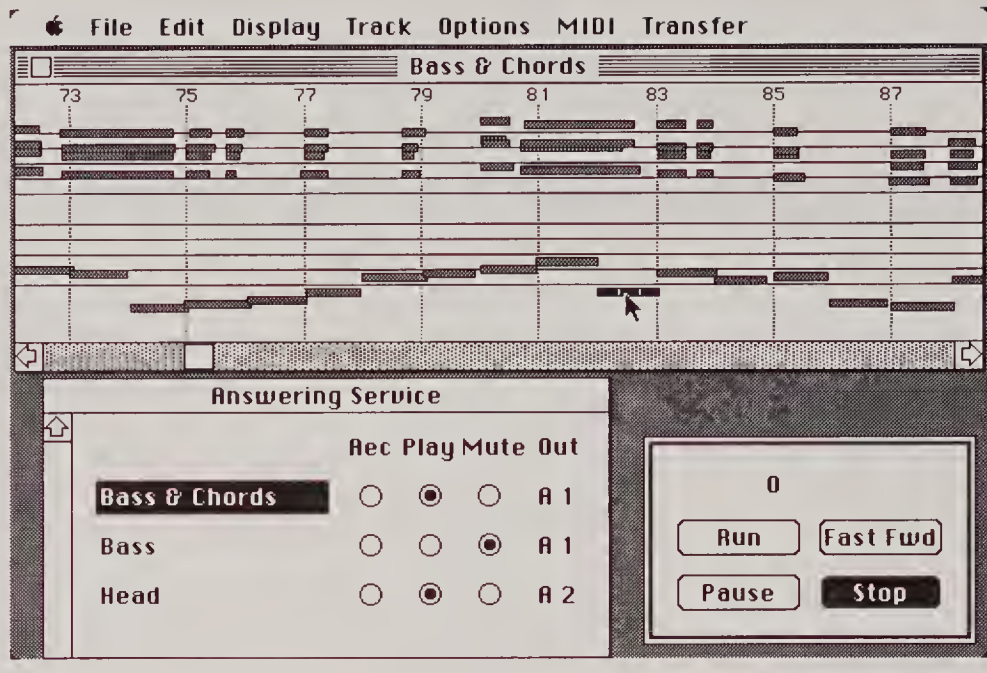

Changing Notes
MegaTrack XL*'s editing feature lets you alter individual notes in a recorded performance. You can alter a note's length, pitch, and position in time. You can also copy, delete, and create new notes.*

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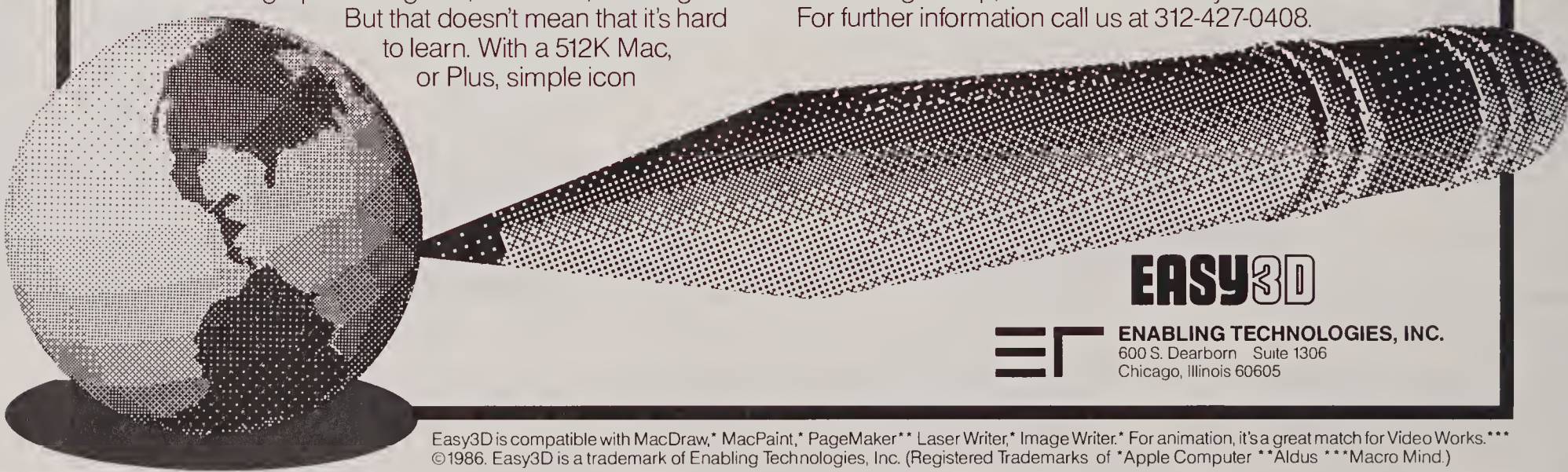

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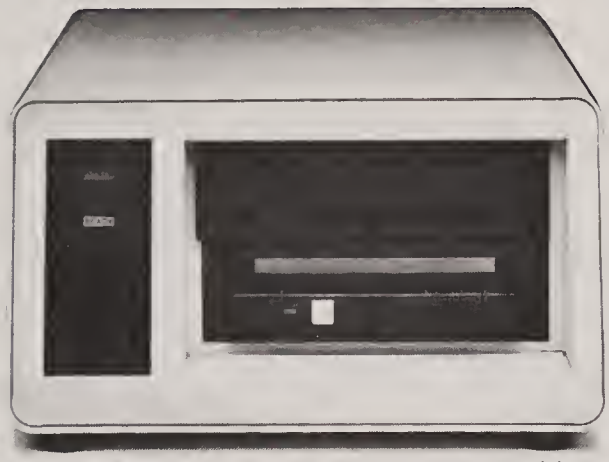

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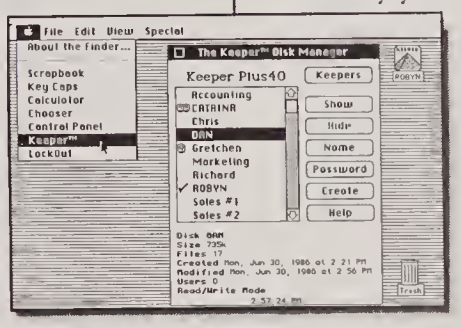

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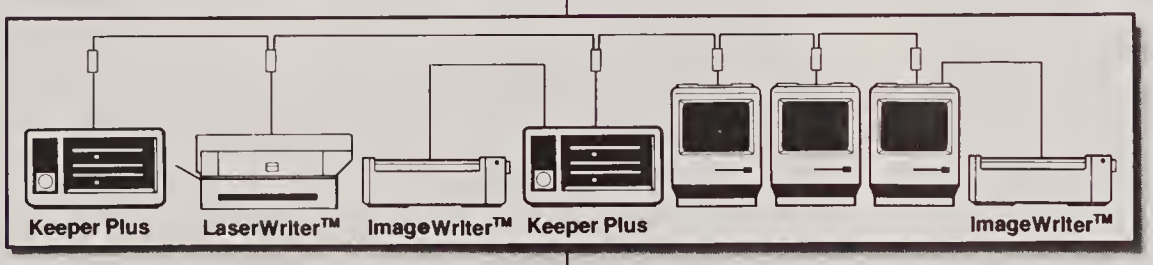

Opcode Systems' *Sequencer,* and Southworth's *Total Music* each require 512K. I'd like to see Musicworks sell *MegaTrack XL* separately, without *Deluxe Music Construction Set,* at a lower price. In my opinion, *Professional Performer* is the better program for professional musicians, while *MegaTrack XL* is an ideal sequencer for beginners and intermediate-level musicians.
—Jim Heid

MegaTrack XL, version 2.1
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Modemette

In today's world of 2400-bps, auto-everything modems, a 300-bps, manual-dial modem is as anachronistic as black-and-white home movies and poodle skirts. Nonetheless, alongside my Mac is a 300-bps, manual-dial modem: Kensington Microware's ***Maccessories Portable Modem.***

The Maccessories modem does differ from its ancestors: it's smaller (roughly the size of a paperback novel), and it's powered (supposedly for up to two years) by a 9-volt battery. A 20-inch cable connects it to the Mac, and the cables going to the phone line and a telephone plug into two modular jacks. The modem comes with a well-written manual.

Dialing by Hand

The Maccessories modem is a manual-dial; to establish a link, you first start your communications program, then dial the number on a telephone. When you hear the remote computer's carrier tone, you flick a switch on the modem from "Phone" to "Apple." The manual-dial Maccessories modem doesn't use modem commands for dialing, answering the phone, or hanging up. That means you need not worry if it's incompatible with your communications software. The trade-off is losing the capabilities that make auto-dial modems appealing: the ability to redial busy numbers and to conduct unattended communications.

I won't say that the Portable Modem is comparable to other modems I've used; after all, it wasn't designed to replace the Hayes Smartmodem. However, the Maccessories modem works well and won't drain a power outlet. It also hooks up to the Apple IIc, and Kensington wisely includes a list of the modem's pin signals in the manual, enabling you to wire a cable for using the modem with battery-powered portable computers like the NEC 8201. Travelers will appreciate the modem's in-a-briefcase portability, but its use may be restricted, since the phones in most hotel rooms are wired directly into the wall, making it impossible to use direct-connect modems. It's a good second or backup modem for the frequent communicator and an inexpensive way for beginners to try their hand at telecommunications.

But even beginners should evaluate their future communications needs before buying the Maccessories modem. Commu-

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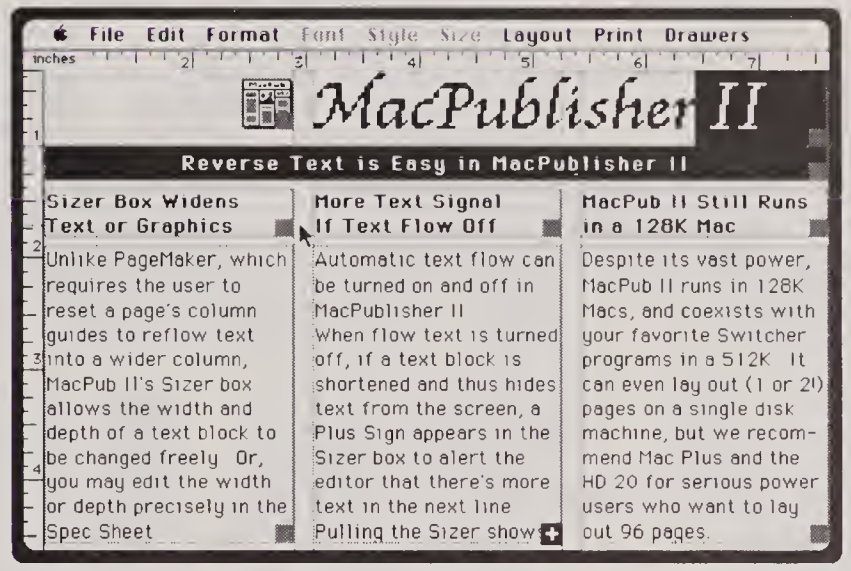

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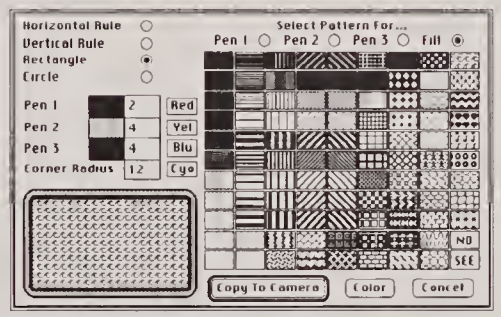
Has Now Been Redesigned With...

MacPublisher II is the first of the second-generation Mac Publishing products. It's easy enough to use for "the rest of us" to intermix text and graphics — for newsletters, calendars, price lists or catalogs, etc. Yet it has the power needed by professionals — technical documentors, page designers, advertising specialists, and graphic artists.

Artists can design thousands of decorative rules and borders with the Graphics Palette which features three pens (each in any of 7 colors and any thickness), 9 shades of gray, and an amazing 99 fill patterns.



The Best Ideas of the Competition

MacPublisher II now includes all the best features of PageMaker and ReadySetGo — a full-size layout page, horizontal and vertical rules, auto text flow, resizing and scaling graphics in the layout, style changes on a line, type and picture Spec Sheets that let you position and size precisely, facing pages, snap-to guides, grid lines, variable column widths & margins, page margins, page numbering, custom font sizes, repeating elements, and direct opening of MacWrite, Word, MacPaint, and MacDraw (pict) files.

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MacPublisher II has gone far beyond the competition with features like **Kerning,** optional batch **Hyphenation,** vertical Depth Justification, a 48-column **Grid** system, multiple alternating left/right **Master Pages,** 96-Page issues, twenty Page Sizes including tabloid/broadsheet (21" x 28"), automatic Continued lines, Zoom views to 900%, built-in **Telecommunications** for sending/receiving stories, an amazing **Graphics Palette,** and a Macintosh first — **Color** printing of text and graphics on ImageWriter II.

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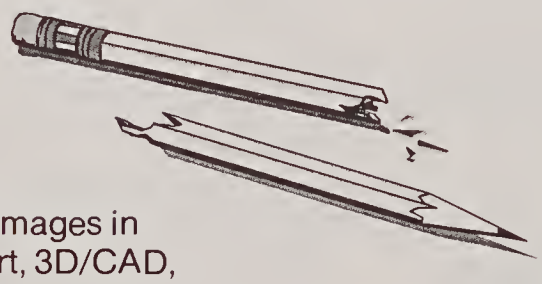

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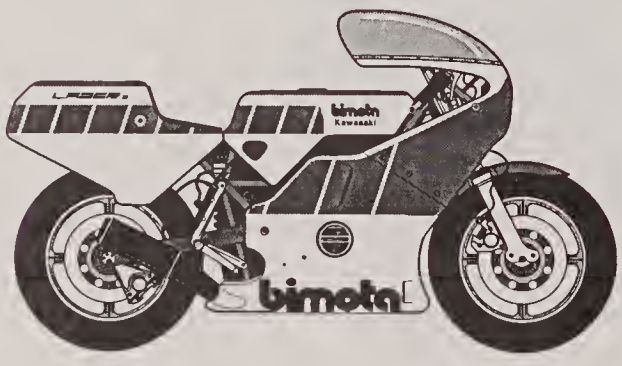

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nicating at 300 bps is four to eight times slower than using today's standard 1200- and 2400-bps modems; you may see your initial savings eaten up by high telephone and connect time charges. And with manual dialing you have to redial when the number you're calling is busy. Finally, remember that 1200-bps, Hayes-compatible modems are available for between $300 and $400 (Apple's 300/1200 Personal Modem and the Prometheus ProModem are my choices). That isn't much more when you consider the advantages offered by such fast, smart modems.—*Jim Heid*

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One on One

Julius Erving and Larry Bird going head to head would be a basketball confrontation to take your breath away. In ***One on One,*** Electronic Arts' programmer Eric Hammond brings this dream match to the Mac screen. Hammond studied hundreds of game films and action photos and consulted with both athletes to reproduce the players' styles and strategies in their digital counterparts.

Jump Ball

One on One offers four levels of competition: Park and Rec, Varsity, College, and Pro. You can assume the role of either player while the computer takes the other, or two people can play against each other. The game includes a 24-second clock, a referee who calls fouls, and instant replays. Animation of the athletes and sound effects, such as the squeak of rubber-soled shoes, add a degree of authenticity. For further realism, a fatigue bar for each player indicates his condition; if your man has expended a lot of energy running and jumping, he slows down, and his shooting and defensive skills wilt. You can reenergize him by dribbling in place or by taking a time-out.

Both players shoot with either hand and execute realistic reverse lay-ups, jump shots, and a variety of dunks. They have,

(continues)

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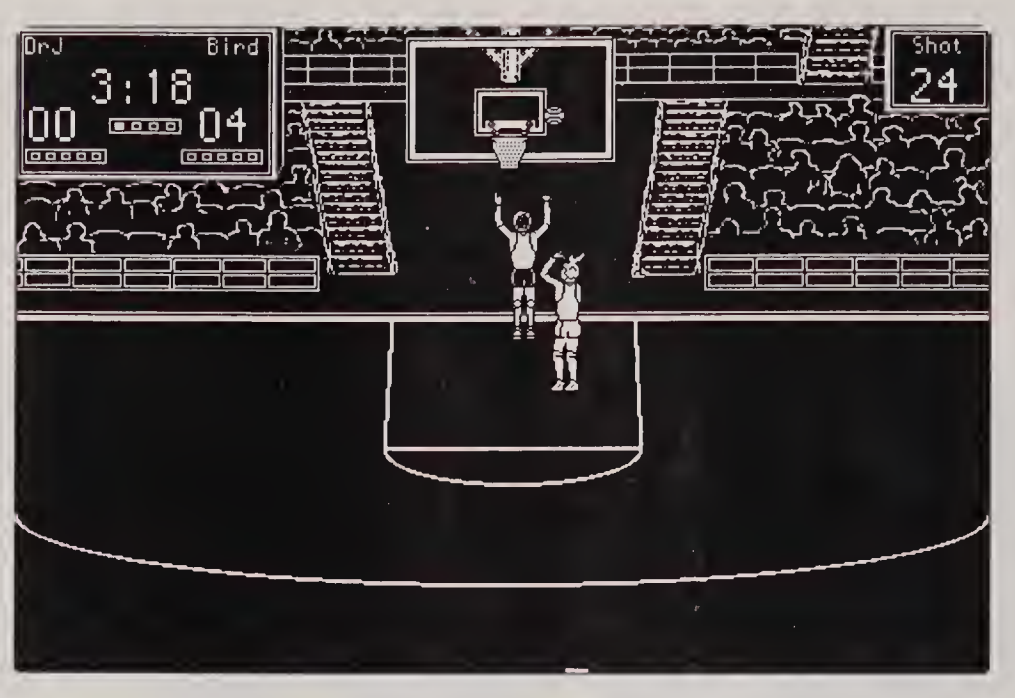
however, no hook shots in their repertoire. And regrettably, you cannot control the type of shot your man takes.

Occasionally play is halted by a slam dunk that disintegrates the backboard. A little man shuffles out, sweeps away the broken glass, and utters some unintelligible phrase. Slow-motion instant replays sometimes appear, but like the foul calls and backboard-exploding dunks, they occur randomly. After seeing these gimmicks a few times, you'll wish for a way to terminate them forever.



Take It to the Hoop
Dr. J goes baseline against Larry Bird in Electronic Arts' One on One.

Mouse versus Joystick

Your opponent, whether Bird or Erving, is a deadly shooter from anywhere on the court. And maneuvering with the mouse, rather than a joystick, has serious limitations. You can't move your player to the basket for rebounds after missing an outside shot, for example. Instead, you flounder helplessly in the backcourt while your opponent dunks the ball with impunity. The offensive player cannot beat the defender to the basket; in fact, from Varsity level and beyond, I was unable to move past my opponent and drive to the basket. Forget playing against Erving or Bird at the higher levels with the mouse—you'll get crushed. However, with a little experience and the joystick, your chances for scoring improve.

The Coach's Advice

The game offers a sense of NBA magic. Hammond captures the styles of both superstars, even though you experience only a few facets of their true talents—those that can be statistically represented. I found the game absorbing because of the degree of realism, but unless you use a joystick, you will be at an unfair disadvantage.—*Richard Miller*

One on One
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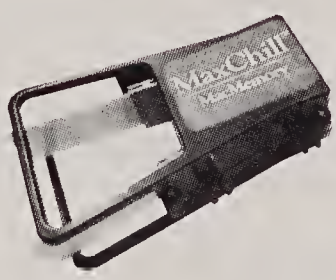
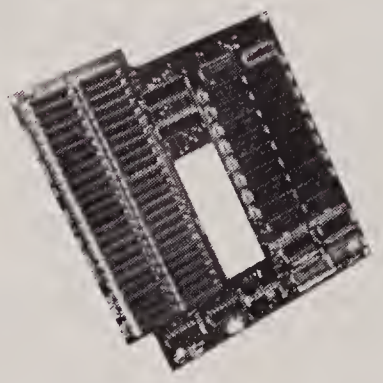
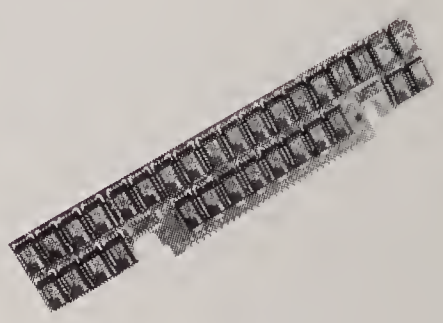
800/245-4525, 800/562-1112 in California
List price: $39.95 □

Max Production







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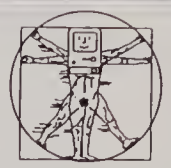

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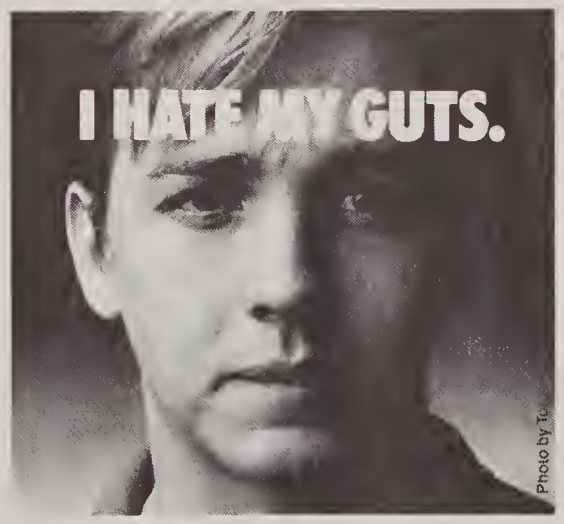

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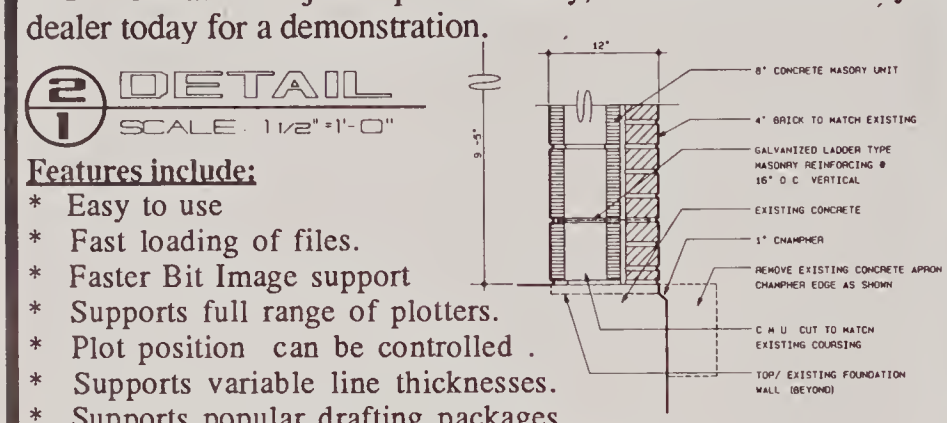

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Circle 522 on reader service card

Open Window

An exchange of Macintosh discoveries

Edited by Jim Heid

This month, a hint that will put you on better terms with your Brother: a modification of the Microsoft Word *printer driver that improves the printer's boldface text. Also, tips on laser-printing both sides of the paper, selecting paper, writing equations with* MacDraw, *and stretching* MacDraw *text for special effects. A* MacPaint *trick improves shadow text, and a reader's clever adaptation of the Finder and the MiniFinder lets you switch between programs quickly. Of interest to* Microsoft Chart*ographers: a reader uncovers a LaserWriter printing problem and offers a solution. But first, news of a shareware utility that modifies programs to show long file names when you open and save documents.*

Looking at Long Names

One advantage the Mac has over many computers is that it lets you give documents long names: 1986 Budget Forecast instead of BUDG86.WKS, or Sales Memo to Duncan instead of MEMDUN.DOC. Often, however, this benefit backfires. If you begin more than one file with the same text—May Sales Forecast Memo and May Sales Forecast Report, for example—you may not see enough of the name in an Open dialog box to tell which is which.

You can tell documents apart by remembering that they're listed alphabetically (for example, the May memo before the May report), but a simple solution resides in the stacks of a MAUG data library on CompuServe. It's a $5 shareware application called *Window Changer,* which modifies Open and Save boxes to show document names as long as 56 characters. *Window Changer* modifies over a dozen of the most popular Mac applications, and its version 1.0 is stored in MACUS DL3 (Programming) as BIGWIN.BIN. For important information about which programs can be modified, download the documentation (BIGWIN.DOC), too.—*Ed.*

A Better Brother Bold

With my Mac and *Microsoft Word,* I use Brother electronic typewriters and the Brother printer driver included with *Word.* The bold text looks anemic to me, however. The Brother prints bold by double-printing the text, displacing the second pass by 1/180 inch. Shadow text works the same way: the second pass is displaced 1/120 inch, resulting in bolder text. I used John Mitchell's *Fedit* disk-editing utility to modify *Word*'s Brother driver, changing bold text to shadowed text.

- Make a backup of the Brother driver, start *Fedit,* and open the backup. Make sure the display is in hexadecimal (choose Display Sector in Hex from the Display menu).
- Choose Hex Search from the Options menu and type **1B4F** (the codes that activate bold text) and then click Find. *Fedit* positions the cursor at the bytes you need to change.
- Choose Hex Modify from the Edit menu and type **1B57**. Double-check your work and then choose Write Sector from the Edit menu and OK from the dialog box.

Ismail bin Mustapha
Petaling Jaya, Malaysia

Two Sides to Every Page

I've figured out how to collate the paper in the LaserWriter's paper cassette so that documents can be printed on both sides, with pages in the right order. It seems trivial, but you'd be surprised how much paper you can waste until you know the secret.

- Print half the number of final copies you'll need. If you need ten copies, for example, print five. If you need seven copies, print four; you'll wind up with eight copies, but an extra is often handy.
- Arrange the printed pages so that all the copies of page 2 are on top, followed by all the copies of page 1, then of page 4, page 3, page 6, page 5, and so on (see "Two-Sided Printing"). If the last page of your document is odd-numbered, set aside the printed copies of that page and replace them on the stack with blank paper. Place the pages in the LaserWriter's tray with the printed side up and the top edge of the pages feeding into the printer.
- Again, print half the number of copies you'll need, then collate the pages from both printings into the proper order. If you end with an odd-numbered page, remember to include the single-sided copies from the first printing.

Brian Lyngaas
Fond du Lac, Wisconsin

This approach works for Microsoft Word *documents, but* MacWrite *throws a wrench into things by printing documents in reverse order so that pages*

(continues)

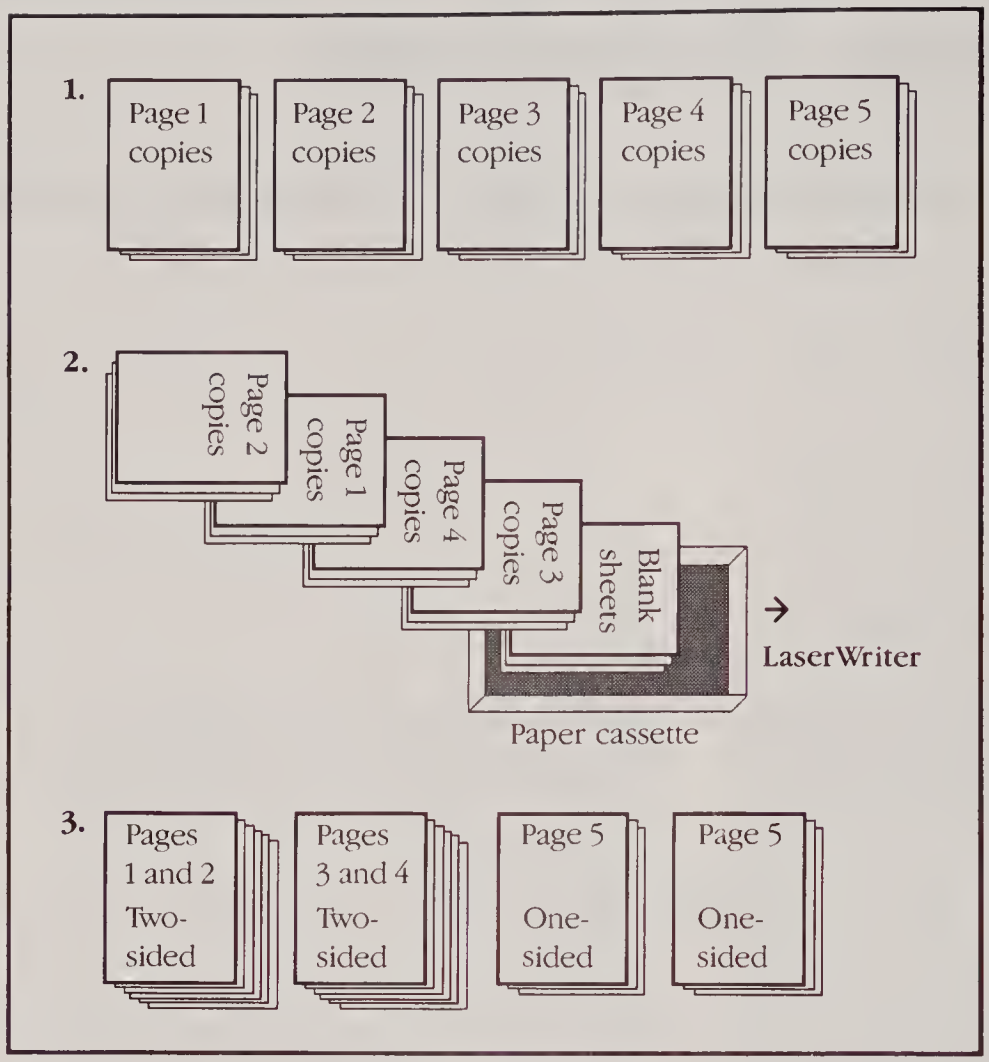
stack up in the proper order in the LaserWriter's output tray. To collate the first printing for a MacWrite *document, start with all the copies of page 2 on the bottom and add all the copies of page 1 on top, followed by page 4 and then 3, 6, 5, and so on.—Ed.*

Solving the Equation Problem

Despite the variety of software available for the Mac, I haven't found a word processor that lets me include engineering equations in reports. Until someone solves this admittedly complex problem, I've resorted to the following procedure to get acceptable results.

I set up *Switcher* to run *MacWrite* (or *Microsoft Word*) and *MacDraw,* with the Always Convert Clipboard option active. When I get to an equation, I switch from *MacWrite* to *MacDraw* and put together the equation. I then select the entire equation, copy it to the Clipboard, and switch back to *MacWrite* to paste the equation in the report (see "Drawing Equations"). This approach requires patience but allows me to align super- and subscript numbers, super-superscripts, sub-subscripts, and

(continues)



Two-Sided Printing *To laser-print a* Word *document on both sides of the paper, first print half the number of final copies you'll need (1). Next, rearrange the pages in the order shown: page 2 copies on top of page 1 copies, then pages 4 and 3, and so on (2). Print the document again on the blank sides and then collate the pages (3). See the text for the order for* MacWrite *documents.*

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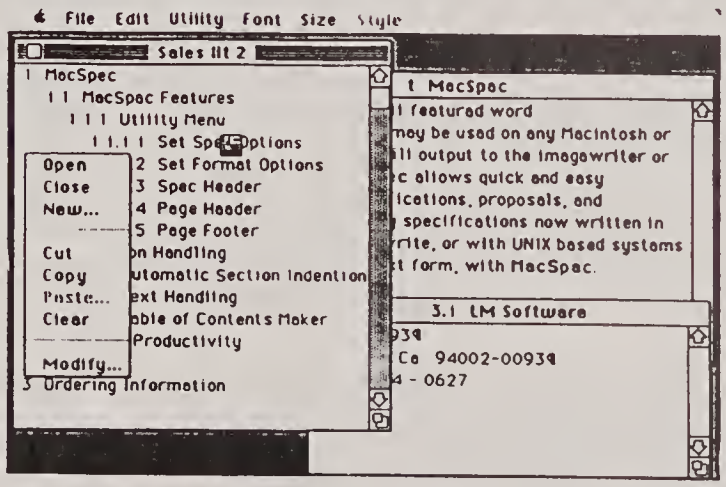

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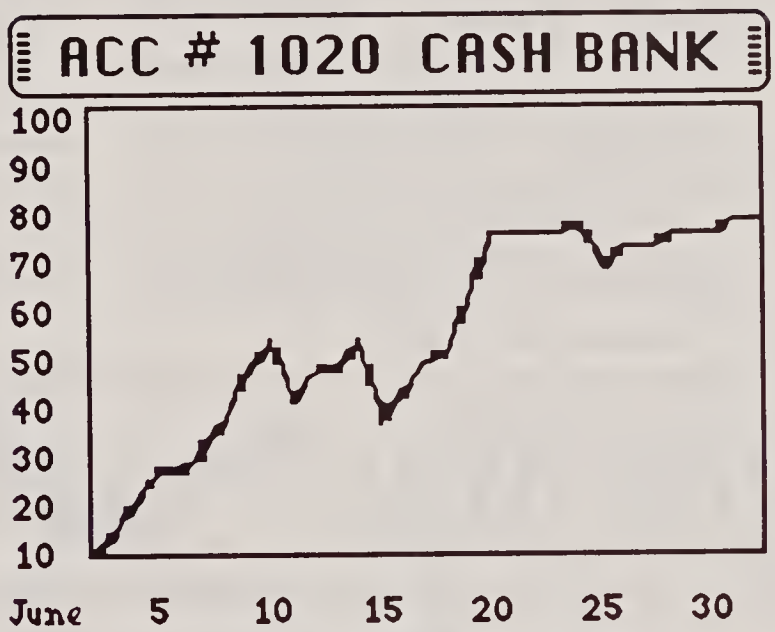

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Drawing Equations
To add complex equations to documents, create an equation with MacDraw, *then select the equation, copy it to the Clipboard, switch to the word processor, and paste.*

anything else you can imagine. The Send to Back and Bring to Front commands are more and more useful as the equation grows; choose the No Fill background to avoid obscuring the bottom layers. Finally, enter the equation number on the same line in *MacDraw,* too.

Richard J. Nielsen
Menlo Park, California

Text Stretching
Text pasted from *MacDraw* into word processing documents behaves differently depending on the copying method. If you select the text with the I-beam pointer, it's copied as text and can be edited once it's pasted. If you select text with the arrow pointer, the type is treated as a graphic object you can stretch by dragging its handles to achieve special effects for banners or signs.

Jess Dorsey
Lubbock, Texas

Stretching type is even more useful for LaserWriter fonts. Stretched or otherwise resized MacDraw *text looks ragged on the screen but, through the magic of PostScript, prints beautifully on the LaserWriter, making this an excellent technique for customizing condensed or expanded headline type styles. This trick doesn't work with stretched* MacPaint *text, since* MacPaint *creates bit-mapped graphics, while* MacDraw *creates QuickDraw images—mathematical descriptions of an object's appearance. (For more information on cutting and pasting Macintosh graphics, see "A Clipboard Collage,"* Macworld, *January 1986.)*

Don't go overboard with text stretching, however; a typeface is designed to look best in its original proportions, and the more it's altered, the less attractive it becomes. Generally, don't expand or condense a font more than 10 or 15 percent.—Ed.

Swapping MiniFinder and Finder
Previous *Open Window* columns described two MiniFinder shortcuts: pressing the Enter key to start the Finder, and holding an Option key while quitting an application to bypass the MiniFinder and go straight to the Finder. I found the tips useful, but for file management, I'd rather quit to the Finder most of the time, with the option of quitting to the MiniFinder when I want to move quickly between applications. My solution: I change the Finder's name to MiniFinder and the MiniFinder's name to Finder, so that I quit to the Finder unless I hold down an Option key while quitting. The following procedure lets you swap the two files' names:

- Install the MiniFinder, then duplicate both the Finder and the MiniFinder (because the Finder doesn't let you change the original files' names).

(continues)

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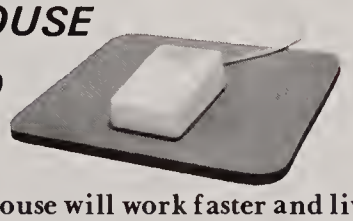

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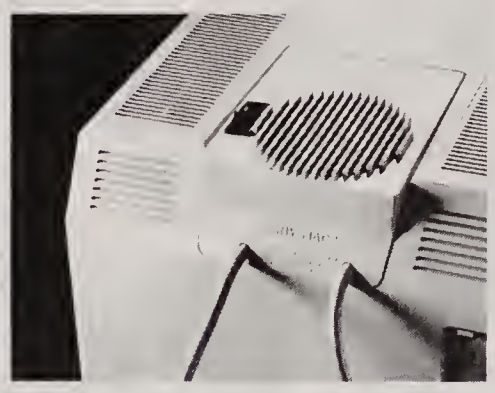

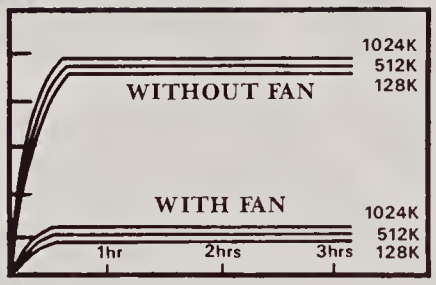

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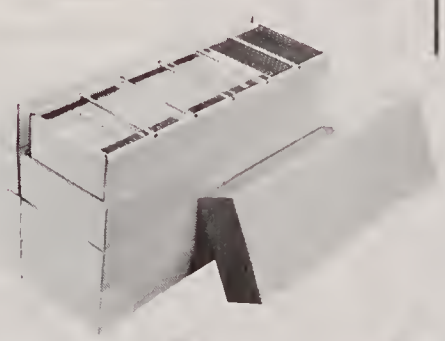

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• While running with a different disk as the startup disk, throw away the original Finder and MiniFinder. To avoid the "Are you sure. . ." queries, hold down an Option key while dragging the files to the trash.

• Change the name Copy of Finder to MiniFinder, and Copy of MiniFinder to Finder.

Shut down and then restart the Mac with the modified disk. The Finder appears as usual, although the Mac thinks it's running the MiniFinder, since that's the Finder's new name.

R. W. Zehr
Sausalito, California

A slick trick, but a caveat is in order: once you've switched the names, you can't use the MiniFinder's Finder button to start the real Finder because the Mac thinks it's already running the Finder. Also, you can't use the Open Other button to start the Finder, since the MiniFinder file doesn't appear in the scroll box. To get to the real Finder, you have to start an application and then quit.

The fact that the Mac always looks for a program called MiniFinder upon quitting has another benefit. Once you've renamed a program MiniFinder, it starts automatically after every quit unless you hold down an Option key to bypass it. For the most flexibility, check out a desk accessory called Launch *(stored on CompuServe's MAUG Data Library 1 as LAUNCH.BIN), which lets you quit one application and directly start another. —Ed.*

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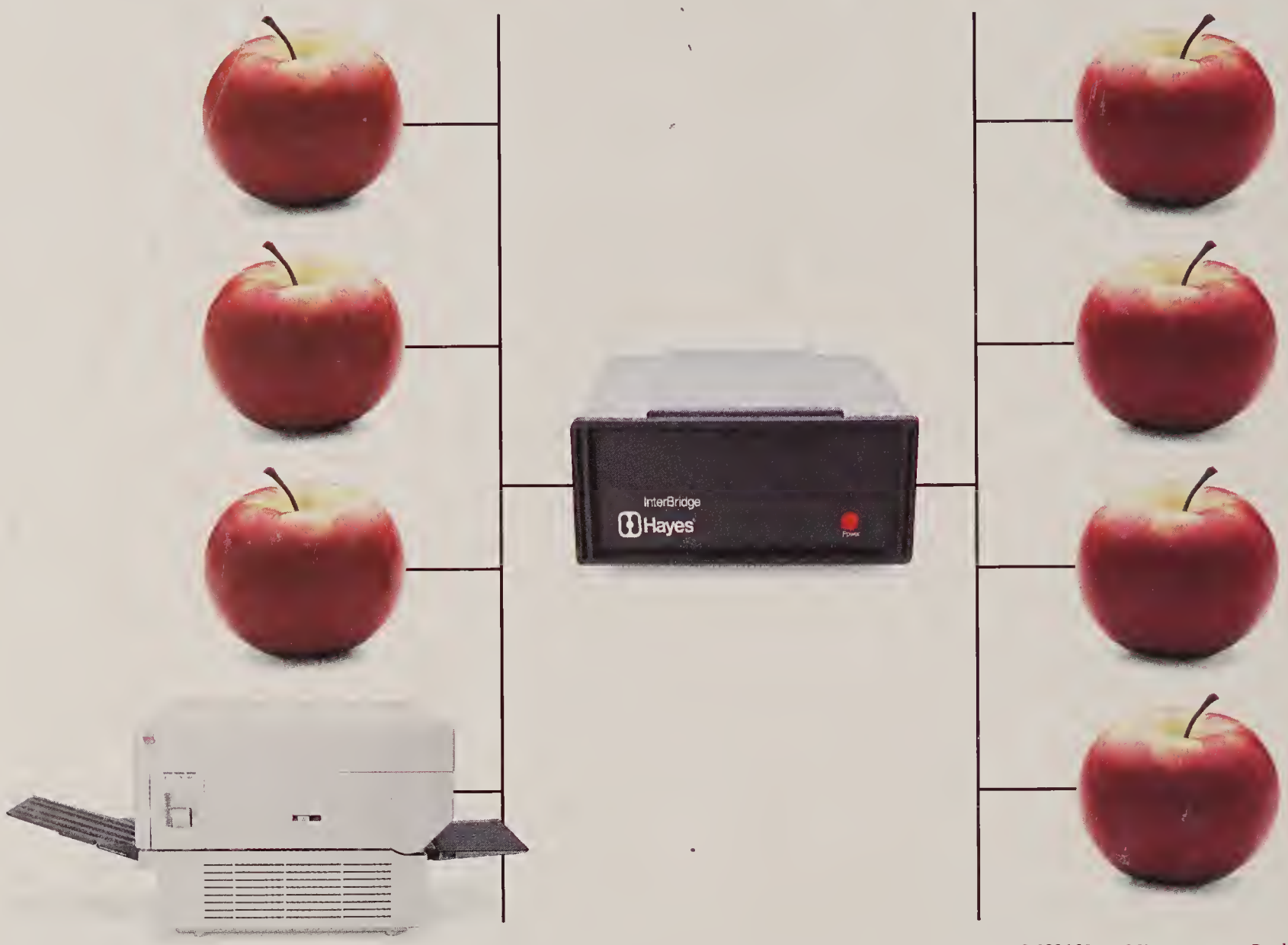

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